COMPUTERWORLD

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Despite the Economy

21,000 Attend the Houston Joint Conference

By Edward J. Bride
CW Staff Writer

HOUSTON – In the hall, memory and microform. In the technical sessions, software and systems.

Standards to the fore, and a retrenchment on social implications.

These are the general impressions of last week's Fall Joint Computer Conference here.

Overall figures showed that 21,000 attended, proportionately down from last Fall's 23,000, but still a somewhat better response than other society conventions held this year.

Attendance excluding exhibitor personnel totaled 15,000, as opposed to last Fall's 17,000, and a drop in exhibitor guests showed that, as one exhibitor put it, the "casually interested" computer user could not afford to travel a great distance to attend.

This result of the current economic downtrend was also blamed for part of the decreased interest in social implications, a trend that has been generally observed since reaching a peak in Boston a year and a half ago.

Only 40 people attended a social implications panel given by "special interest" groups of the Association for Computing Machinery (ACM) and the Institute of Electronic and Electrical Engineers (IEEE), two of the American Federation of Informational Processing Societies senior member groups. The parent federation was also a cosponsor.

The issue of technology's, or the computer's impact on society was absent from the rest of the conference, although some technical papers dealt with applications in vice, games, traffic control, and manufacturing.

These were tutorial, however, and were not intended to open a forum for the social implications of such uses of the computer.

The technical speakers in general were well prepared, well informed, and delivered papers that were pertinent to the session's titles.

The sessions were also highly attended, with some conducted before standing-room-only crowds in rooms equipped to seat over 500 persons.

A General Success But . . .

The "extracurricular activities" were also well attended, starting with the barbecue on Tuesday, and concluding with the luncheon on Thursday.

At the luncheon, the "Best Paper Award" was given to D.C. Bossen, D.L. Osapko, and A.K. Patel of IBM Laboratories for their presentation on Optimum Test Patterns for Parity Networks.

The Harry Goode Award, Afips' highest honor, was then given to Navy Cmdr. Grace M. Hopper, who promised to continue working on new ideas "before I retire five more times."

Art Buchwald, humorist, columnist and author, regaled the audience with a few comments on his battle with computerized billing companies. He did at least one column on the subject, and got 200 letters from readers, who also sent copies of dunning letters from the organizations with whose computers they were having trouble.

In the exhibit hall, memories held the spotlight, as semiconductor manufacturers made their pitch to the OEM market, and compatible core extension makers delivered a strong pitch to IBM users.

Microfilm and microfiche were heralded by manufacturers, and some users, as possible solutions to paper problems. Several units were on display. Despite some promising sales contacts, however, manufacturers said the immediate prospects for large orders were not good.

. . . Economic Pessimism

This general pessimism was evident in the fact that about a dozen exhibitors dropped out in

(Continued on Page 2)

Sabotage Course Shows Action May Have Bad Effect on Society

By Michael Merritt
CW Staff Writer

SYRACUSE, N.Y. – Humanities 480 at Syracuse University is a course in the nonviolent sabotage of computer installations.

A result of last Spring's student strikes, the course is a workshop for students who feel that some computer systems are working against the best interests of humanity, and should therefore be disrupted.

One of the outcomes of the workshop, though, is apparently a growing realization that there are many ramifications to effecting such sabotage – ramifications that show such sabotage can hurt the society as a whole.

Leader of the course is Hamilton Armstrong Jr., manager of systems design and development for a unit of Colt Industries. He said that in devising ways to disrupt data banks, the students have had to assess the effect disruption has on society. They have discovered, he said, that the effect is not always positive – nor are the plans always easy to carry out.

A subject for disruption the class discussed, Armstrong said, was the phone company.

One of the means suggested was to disrupt the billing service, by getting thousands of people to alter their punched card bills.

The students soon discovered that it would take many persons to accomplish anything significant.

The questioning then turned to results, and exploration of the desirability of disrupting phone service, its social cost as well as its feasibility.

Armstrong said that his role in the course primarily is to advise on the technical aspects of proposals. The students, he said, are coming up with the ideas themselves.

He noted that most information systems have been designed to store normal information and report out only exceptional data.

This leaves the system vulnerable to someone who can generate a large amount of false data which "swamps the few delegated to handle the expected small quantity . . . This eventually causes the system to break down," he said.

"The course is exploring in depth the techniques for accomplishing . . . [this] and/or developing alternate approaches," he went on to say.

"At the same time . . . [the students] are researching methods of organizing implementations and determining the costs to the protestor, the data base owner, and society as a whole."

Detroit's Canvassers Axe Punch Card Vote

By Thomas J. Morton
CW Midwest Bureau

DETROIT – In a three to one vote, the authority responsible for determining the accuracy of the Nov. 3 punched card election count, the city Board of Canvassers, will not certify the election as final and official.

As a result, the election that had its count delayed for 56 hours [CW, Nov. 18] could possibly be nullified.

Since the city board has not certified the election, that task must go to the Wayne County board for certification. After the county board, the state board gets a chance to approve or disapprove the count, and the whole election for that matter.

If none of the boards certifies the election, a state court could declare the whole process null and void and make the city of Detroit hold another election.

Because of the possibility of punched cards not fitting properly in the Votomatic machine during the election, which could have resulted in voters miscasting their votes, some sources feel that the election has little chance of being certified.

H. Ross Perot

Audience listens attentively to keynote address. (FJCC Photos by Farmer)

Problem Definers Failing Society?

HOUSTON – "On a 100-point scale, I would give problem definers only five points," keynote speaker H. Ross Perot told more than 2,000 attendees at the Fall Joint Computer Conference.

The problem today is that there are many people who can define the problems and fret about them and even propose solutions, but few people with the leadership training to implement the solutions, he said,

Perot, president of Electronic Data Systems and famous for his attempts to help American prisoners of war, criticized the

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Just Two Different Tribes

Behavioral Styles of Programmers, Analysts Differ

By Phyllis Huggins
CW West Coast Bureau

HOUSTON – Programmers and system analysts are from two different tribes, or so it would seem from results presented in the Broad Perspectives session on "A Humanist's View of Data Processing."

David B. Meyer, national chairman of the ACM Special Interest Group of Computer Personnel Research, told a standing room only crowd that the behavioral styles of programmers and analysts differ sharply.

Programmers have a low need for routines and procedures while analysts create them. Programmers are motivated by results and analysts by rewards. Programmers have high mechanical interests and analysts have none, he said.

In regard to social interaction, analysts have a high need and programmers have a low need. Programmers have some need for systematic, methodical procedures and analysts have a high need.

Intellectual achievement is rated high in value by analysts and indifferent by programmers. Both are lukewarm over need to identify with authority, according to Meyer.

Programmer Traits

Other behavioral aspects of programmers are that they do not seek approval from others, do not like structured situations, do not want to supervise or be supervised. They move away from aggressors, have high confidence in their ability to influence the future, are orderly, perseverant and detail attentive.

Top requirements for job satisfaction for programmers were in this order: good coworkers, compensation, variety, and security.

At the bottom of the list were ability utilization, responsibility and advancement, recognition and independence, Meyer said.

One main difference discovered between analysts and programmers was that analysts will come up with non-computer solutions – manual or mechanical files for example, while programmers are computer-bound.

The real difference between groups was held to be education, not training. To become analysts programmers should go back to the universities.

Meyer said they need to learn computer science technology, analytical tools, management and organization, information processing systems, systems design, and communications ability.

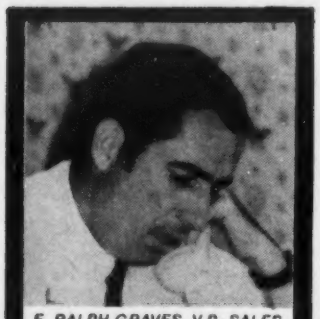
Productive 45% of Time

In another study it was discovered that programmers are producing only about 45% of the time. This, however, is also true of engineers. In addition the study said, engineers think only 2% of the time.

The audience objected to this, saying that a lot of thinking is done while shaving, driving to work, and conducting other activities away from the confusion of the office.

The best way to motivate programmers to rise in the organization was found to be interactive teams – users, programmers, and systems analysts.

A solid warning was given the group that programmers and analysts are participating more and more in policy making for their organizations and with that new role comes increased responsibility.



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Effort of Government Must Aim To Make Systems User Oriented

By E. Drake Lundell Jr.
CW Staff Writer

HOUSTON – The major government effort in regard to the computer industry "should be the effort to make computers user-oriented," Rep. Jack Brooks (D-Texas) told a session here last week.

"After 25 years, the user of a computer is limited to the trained technician. The time has come for the computer industry to respond to the needs of the consumer," the legislator declared.

"Through development of more sophisticated software and hardware, the industry should make it possible for people in government, business, and industry who need computers to use them without months of training," Brooks continued.

At the session on the effects of government requirements on the computer industry, Dr. Herbert R.J. Grosch indicated that the government can have a great impact as the second most significant force in the computer community.

He was quick to point out, however, that the largest influence, by about a factor of seven, was still IBM. The government was second – and definitely the largest user voice – since it spends more on computers than the value of equipment produced by other manufacturers.

Jim Poppa of Honeywell Information Services indicated that the government, by its very size, often leads the rest of the user community in procurement policies and in some applications by two to five years.

The government has been pushing for separate procurement of peripherals and software for several years, but it has only recently become a prominent force in other-user buying.

Benefits Could Be Shared

Joe Cunningham, of the Office of Management and Budget, indicated that the government could develop measurement routines and procedures to evaluate the efficiency of computer operation and that these benefits could be passed on to other users.

Other users, though, will have to play a more active role in developing guidelines for compatibility between systems for such procedures to be really effective, he said.

Brooks also said that the purpose and goal of the Federal Government in this area will be to try to get the industry to develop ways to "broaden computer utilization and put computers at the forefront of American industry."

Twenty Students Take Over DP Center, Promise They Don't Plan Any Damage

SALEM, Mass. – The computer center has once again become the symbolic object of student unrest.

About 20 members of the Union of Student Involvement (USI) have taken over the DP facilities of Salem State College, holding it as ransom for administration acceptance of 42 wide-ranging demands.

According to Jerome Ornstein, manager of the small (Univac 9200 plus peripherals) center, the take-over is not very serious, but "in the long run it will put a gaping hole into my operations schedule."

The students have indirectly promised that they will do no damage to files or equipment. Since the system is card based, Ornstein said, there are no backup files, though, and the center's work has stopped.

Some student paychecks for part-time work are processed at the center, however, and the USI members have said that they will permit them to be run off.

According to a Salem State spokesman, the main activities of the center are grading, some tuition bookkeeping, statistical work for admissions, and occasional research, all of it non-defense.

Among the student demands are abolishment of a committee that passes on qualifications of student teachers, more student representation on campus committees, and a birth control center on campus.

Problem Definers Seem to Fail

(Continued from Page 1)
reorientation of the educational system that followed the launching of Sputnik.

He said the new emphasis on technology was training people to define problems instead of giving them the broad training necessary to solve problems.

When students are given leadership training, he said, they cease to be overwhelmed by today's problems.

"The next 10 years are going to be the most exciting in the world's history, and the 10 years following that will be even more exciting," Perot predicted.

'Fantastic Opportunity'

"We are part of a new basic industry. We must learn a lesson from the other industries and that is that we have to serve people. We have a fantastic opportunity."

The computer field will need the same kind of leadership skills that built the transcontinental railroads, except that the tools now will be computers instead of shovels, he said.

"Don't talk about what is wrong, but about how to make it right," Perot said. Then stay with it until it's fixed, he added.

Perot concluded by challenging the audience to set a personal goal to do the best they could to leave a better world for their children.

Perot, who has said he accepts with pride the label "super patriot," was given a standing ovation after his speech.

21,000 Attend Joint

(Continued from Page 1)
the final days. A total of 253 companies were represented in 816 booths.

The exhibitor total included 19 from Texas, and 13 foreign firms.

Preregistration was about 2,500, including 500 "early" registrants here in Houston before the conference officially opened.

There was a marked absence of carnival-type "barkers" at this show, as Afips had promulgated "guidelines" discouraging exhibitors from promotional gimmicks, and from other non-instructional practices.

Dr. Richard I. Tanaka, Afips president, said that exhibitors had shown a positive reception to the guidelines, which become firm policy for future conferences.

Exhibitors retain the ability to involve attendees in their displays, which will permit Nuclear Data to return with its chess-playing minicomputer, if it so chooses. The mini "enjoyed" high popularity at FJCC, although it was beaten by some players.

The cause of standards was pushed by attendees, panelists, Afips officials, and audience participants at several sessions.

The banner was carried at the social implications session, at sessions on programming languages, and by Tanaka, who noted "even minor concessions in standards" have "massive economic implications."

Tanaka's remark, at the closing of a press conference, set a minor theme for the 1970 Fall convention, whose official title was "Systems and Society."

While there appeared to be no solutions to user apathy to this cause, it will probably remain in the spotlight for some time, especially since the theme of the Spring show is "Responsibility."

Universities Failing to Provide Adequate Background for DP

By Phyllis Huggins
CW West Coast Bureau

HOUSTON – What business needs from universities and what universities need from business came into the spotlight at the ACM Special Interest Group on Computer Science Education symposium at the Fall Joint Computer Conference.

A packed meeting, roughly 175 university people (only five were from industry) listened intently as Russell M. Armstrong and Emmett K. Platt of Weyerhauser Co. said that universities are not giving business what it has to have for the survival of its sophisticated computing requirements.

At the same time, Robert R. Korfhage of Southern Methodist University made an appeal for greater interchange between the two worlds.

The Weyerhauser team cited the cast of the meeting of a business conference on management information systems at which the universities were criticized for being generally unresponsive to business needs and also unable to supply the quantities of people that predictions indicate will be required.

As a result business must count on in-house training and on applying pressure on the academic community.

As a result business must count on in-house training and on applying pressure on the academic community.

Korfhage challenged business on its viewpoint that it is possible to take a liberal arts graduate, give him some training, and call him a programmer.

He also appealed to the business community to develop exchange type programs with every university.

As computer science is an applied science – it has to work or it's worthless – mistakes can be a disastrous loss. Computer science by its nature, requires close interaction with the business community.

To achieve this, Korfhage suggested that every computer science department set up an agency to channel consulting work to the professors so that classroom theory is continually being pollenized by business world reality.

Far from being a deterrent to research, he cited his own example where a number of academic dissertations came from one consulting job.

He asked further that business increase its sabbatical leave program to permit people in business to take a few weeks, a summer or a year and go back into university life.

This would require adjustment of academic snobbery to Ph.D. requirements as many people in business do not have the approved degree. There are other problems, but Korfhage feels it is essential that the time lag between what is needed and what is delivered in education be shortened for this vital field in order for universities to train students for worthwhile careers.

The only way to do this, he said, is to create more two-way streets between the two communities.

In chastising the academic community, the Weyerhauser people said business has received graduates who tend to enforce one's worst expectations.

Recent complaints cited were:

- The student has only written a few problems in a computer language, many of which he has never finished and most of which he has never adequately tested.
- He may have no concept of designing a program, let alone a system, and flowcharting, or documentation is an anathema.
- He cannot cope with large problems – large files, programs larger than core storage, or programs which take a long time to execute.
- He may often be an extremist dedicated to bit manipulation of meta languages or whatever subject on which he may have done a research paper.

As if this wasn't enough, they claim students have developed incredibly bad habits in attacking a problem such as:

- They don't develop a clear understanding of the problem.
- Even if they do understand they don't examine possibilities and trade-offs.
- Students don't develop a plan of attack and extrapolate from it possible ramifications and develop appropriate contingency plans.
- They don't build checks into implementation, and they act as if everything is going to work in the way they hope it will.
- They cannot segment the problem, and therefore the solution into its constituent parts, creating redundancies and ommissions.

Compounding the problem between business and academia is the report that almost all computer science Ph.D.s go into staffing other computer science departments.

This creates an in-bred cult of theory as divorced from reality. Altogether there were 18 speakers at the all-day and evening session of SigCSE. The attendees addressed themselves to a number of other problems.

Massive Display

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Spies are Needed

HOUSTON – "Any manufacturer today can be shown in a harsh light by a non-partial user. Monitors should be used to give us feedback to the manufacturers." This was the conclusion of a paper, "Spy – A Program to Monitor OS/360" by R. Sedgewick, R. Stone and J.W. McDonald of Western Electric Engineering Research Center at a session on Operating Systems and Schedules.

The authors developed a monitor for OS/360 and, as one of the critics on the panel said, it showed that users tend to overestimate their core storage needs. While the authors did not suggest modifications, their presentation indicated some modification was needed.

A major problem facing the manufacturer of large-scale computer systems today is that of measuring the performance of a computer in conjunction with the operating system which drives it. The problem is under study for operating systems currently in the design and implementation stages.

The goal is to establish reasonable criteria for measuring performance, to find means of actually making the measurements, and ways of using the information to optimize performance for a particular user's environment.

Well Attended

More Sophisticated Features Sought in Software Languages

HOUSTON – The opening technical session at the Fall Joint Computer Conference last week drew nearly 500 attendees, who heard various ideas on the need for more sophisticated features in programming languages.

Entitled "A Spectrum of Programming Languages," the session was really more a "sampling" of current ideas on the betterment of the user in the area of programming practices.

The concept of "extensible" languages received much support, as the paper, authored by Stephen A. Shuman and P. Jorrand, postulated that a standard, low-level base language could be used as the starting point for user-developed special languages for particular applications.

Shuman, of the University of Grenoble (France), summarized the paper. Jorrand is attached to the IBM Scientific Center in Grenoble.

The basis of the Shuman-Jorrand theory of extensible programming languages was standardization in the definition, translation, and "intermediate language" stages.

Shuman stated that, using this concept, a "single compiler implementation" serves for all extended languages, and that most overhead is in the extensible language translator. He noted the "extension mechanisms" can be disabled when no longer required, allowing for a restoration of economy.

The author claimed that acceptance of these ideas would end the all-too-common occurrence of programmers "proposing new languages without having executed a program written in that language."

The concept would combine the advantages of "many special languages" and one universal language, while eliminating the drawbacks, Shuman concluded.

The two other papers in the session dealt with particular programs, rather than concepts.

M.E. Barton, of Bell Telephone Laboratories, discussed the "Macro Assembler, Swap, a General Purpose Interpretive Processor."

Used to develop high-level languages, and to generate supporting documents for programs, Swap can also be used as a macro preprocessor for other languages."

Other panelists likened Swap to an IBM 7094 Assembler, and said it was extremely generalized in format but nonetheless a powerful general-pupose interpretive processor.

After the formal presentations, Dr. Robert Morris of Bell Labs commented that the extensible language approach might be of most benefit to the users.

He stated that PL/1 is "out of date;" the user cannot afford the proliferation of languages entailed in adopting Vulcan; and Swap might be too general.

Dr. James Painter, a senior IBM programmer, disagreed, claiming users could "build their own languages" out of Swap, which might be expensive, but would be easy to use, once learned and accepted.

Painter, an invited panelist, as was Morris, agreed that a general base language with a translator "may be the way to go," which indicated he did not dismiss the extensible language idea entirely.

Morris concluded that a low-level base language with a good library for the "extensible" part of the language would "bring sanity to extensibility."

Cost Sited as Main Hindrance To Computer Assisted Education

HOUSTON – Computers can have a great impact on the educational process, especially in the areas of education of the physically or socially disadvantaged, but they have yet to make any significant impact on general school educational programs.

These are the major conclusions drawn from last week's session on Interfacing Computers and Education here at the Fall Joint Computer Conference.

To achieve a greater impact, the costs of present-day computer-assisted instruction (CAI) systems will have to be cut drastically, from the current approximately $2/student hour to well below $1/hour and probably to below 50 cent/instructional hour, session attendees indicated.

In addition, the true worth of CAI will not be realized if the tool is used just as an adjunct to present methods of teaching, according to session chairman A.I. Katz of Rutgers University.

The new systems will have to be truly integrated computer educational systems, he said, making use of new techniques in both education and technology.

Motivation Achieved

One of the major areas in which computer-based education in DP techniques for economically disadvantaged has shown its success has been in the motivation of students to go on to further education, according to M.G. Morgan of the University of California at San Diego, in his project report on Computer Jobs Through Training.

The major present day problem with operating this type of "uplift" program at the present time, he said, was the lack of funding available from all levels of government.

"Today," he said, "the money is just not available, no matter how successful the program or its possible economic effects in the future."

As a result, he stated, most of these projects are strapped for the necessary resources to improve or expand their programs, and in some cases to even keep going.

In education of deaf students, interactive displays have particular advantages, according to R.H. Newton of the Rochester Institute of Technology, who reported on the program at the National Technical Institute for the Deaf.

With a high-speed CRT display, he said, the deaf were, often for the first time in their lives, receiving immediate responses to their questions and statements.

The psychological impact of these systems were very significant reward factors in gaining and holding a high level of interest among these students, he indicated.

In the third paper, M.C. Woodfill of Arizona State University described how actual hands-on experience with a minicomputer helped stimulate the interest of graduate students in a computer science program on digital logic design.

All of the panelists agreed that computer systems could not only aid teaching, but also "turn on" students in the process.

The only major problem, according to an audience member, was to find a way to now "turn on" the teachers in most of the American school systems to the potentials and profits that could come from more widespread use of CAI techniques.

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Exceptions and Lack of Communications Believed Factors Against Standards

HOUSTON – Two vacuums provided a platform for two crusaders of computer standards last week, with end-users as hopeful beneficiaries.

A session at FJCC devoted to "Computer Procurement Requirements in Research and Development" was attended by about 150 people, many of whom expressed the various problems of the lack of hardware, software, service, language, and legal standards.

One attendee suggested that the National Bureau of Standards (NBS) should conduct seminars, during which various requirements would be discussed and promulgated among user agencies, government and otherwise.

Behind the suggestion, according to some attendees, was the "non-use" of standards already authorized by NBS, the American National Standards Institute, or various user groups.

Mrs. M.E. Stevens of NBS noted there is a communication problem, in that users do not try to exchange ideas with the government, which has a strong interest, and a strong arm, in the development of all forms of standards.

Session moderator J.L. Raney, of Nasa's Manned Spacecraft Center here, recalled how standards were laughed at in the early sixties, but now there is a serious and recognized need for these standards, but little support for their development.

Raney and the two speakers told a press conference that getting the user to standardize his data descriptions ("vocabulary"), as well as hardware and software specifications, and legal requirements, is part of the total effort needed to promote the interests of users.

IEEE Computer Group Soon To Be 'Computer Society'

HOUSTON – On January 1, the Computer Group of the Institute of Electrical and Electronic Engineers, Inc. will become the IEEE Computer Society.

The change in status recognizes the group's rapid growth, its wide range of member services, and the importance of the computer and information technology field. The Computer Society will have over 17,000 members.

Professor E.J. McCluskey, director of the Digital Systems Laboratory at Stanford University, is currently group chairman and the nominee for president of the Computer Society. In commenting on the status change, McCluskey outlined some of the group's history, and detailed a new type of Society membership for the computer professional who is not an electrical engineer.

"The changes which we hope to implement are aimed at increasing our ability to serve a different type of member. Specifically the innovations should be most signficant for that newer type of professional who regards himself as a computer engineer or scientist rather than an electrical engineer."

1892 a Confusing Date

GLENDIVE, Mont. – Justice of the Peace John Kemp has discovered that computers are creatures of the 20th century.

Six months after he had completed an extension course at Dawson College, Kemp had not received credit from the Department of Justice, sponsor of the course. It seems the department's computer was confused by the judge's birthdate of 1-9-92 on his application, and kept rejecting the application.

Users Reluctant?

Money Problems May Hurt Standards Fight

Edward J. Bride
CW Staff Writer

HOUSTON – If not despair, there was plenty of head-shaking at the reluctance of users to get involved in standards efforts, as the Standards Committee of the Association for Computing Machinery held its meeting during FJCC.

Most members expressed pessimism over the future of the standards effort unless users come up with the cash and the will to improve their lot.

'Infiltration'

As a problem typical of today's money crisis, Thomas Steel pointed out that manufacturers had infiltrated the ranks of users' groups, because of Users' apparent inability to take a stand. He pointed to the Joint Users' Group (Jug) as his chief case in point.

Chairman Dr. J.A.N. Lee said that Share, the IBM users' group, was seeking membership on the computer committee of the American National Standards Institute (Ansi), an event which would set a precedent if allowed, and would open the doors for all users' groups, he stated.

Share has become incorporated, and recently opened its doors to all users of IBM CPUs, not just entire systems, but the consensus of members present held that it would be unwise to permit the Share membership on the computer committee without further study.

Steel suggested that Share might resign from Jug because of the strength of manufacturers in a territory which Marjorie Hill, Control Data representative, said she considered "inappropriate" for manufacturers to enter.

She said a manufacturer's presence at Jug meetings might be valuable, if the presence was "strictly as an observer," and not as a voting member.

All present agreed that the strength of manufacturers in a users' group meant only the weakening of the user.

Obtain Financial Backing

And if users don't try to push for their own cause, then a truly shaky position is in store for that segment of the community.

Dr. H.R.J. Grosch, of the National Bureau of Standards, said the only way for the standards effort to go forward is for users to obtain financial backing from, say the government, or even from organizations and institutions, and put forth a full-time effort.

Grosch echoed Mrs. Hill's statement that the American Banker's Association was greatly responsible for the magnetic-ink standard on checks, mostly because they could identify a profit motive.

To further muddy the already murky waters, the IEEE standards effort is nearly dormant, Lee stated, leaving the entire project on the shoulders of a willing ACM committee and an unwilling public.

So the shaky economy has apparently taken another victim, even if only temporary, for if users cannot identify a concrete profit motive for standardization, it is difficult to imagine supporting such an effort with non-existent "suplus" funds.

Committee members were expected to take this message, and the predictions of impending gloom, to other meetings throughout the week, as Jug and other adjunct confabs were scheduled all week long.

Jovial Study Postponed

In other business, it was reported that a standardization study for Jovial would be postponed until the Department of Defense reported whether it could support Jovial as a standard language. The DoD report is expected around the first of the year.

Camping Out

Tightly packed with a 370/155, System 7, and the 129 card data recorder, the IBM exhibit was simple, effective and to the point.

Communications Panel Rehashes State of Industry Development

By E. Drake Lundell Jr.
CW Staff Writer

HOUSTON – It almost seemed that everyone had been there before as the speakers at the panel on computer and communications repeated old charges, old arguments, and displayed few new ideas.

In fact only one thing was new – there seemed to be general agreement that the often conflicting competitors in the field should at least continue to talk to each other and that, just perhaps, all of the problems in this area could be worked out through cooperation.

The new note of cooperation was the result of a recent meeting between all of the contenders this fall, which produced a consensus that the only way to clear up the major problems was through person-to-person contact on a less rancorous basis than has often characterized these exchanges in the past.

But even if the rancor was sometimes at least thinly veiled if not in truth completely absent, the arguments were pretty much the same on the part of the major contenders with an economic interest in the race.

V.N. Vaughan and H.S. McDonald showed the flag for AT&T, a sometimes onerous duty since many users have not gotten the word of the new truce.

The major challenge for the '70s in the Ma Bell view is to develop a base that will be able to handle the tremendous growth the Bell System is predicting for the '80s, basically ignoring demands for much improved service now.

They argued that the service has improved over the past 10 years and is getting better all the time. Reluctantly, after prodding from users on the floor, the Bell men admitted that there were still major problems in the local loops of the present telephone network.

Vaughan and McDonald proudly pointed to many of the favorable uses being made of the present data communications set-up; i.e., medical applications, speeding business data, etc.

On the other hand, J.D. Goeken of Microwave Communications Inc. upheld the view of the new specialized data communications carriers by pointing out some inefficiencies in the present set-up and pushing for his firm's planned tailor-made communication channels.

The greatest issue for the '70s, he said, is whether MCI will be able to remain in operation.

The usual token pledge for standards was made by a non-IBM manufacturer, in this case N. Gorchow of Univac. Gorchow admitted that he was pushing an old saw, but said that even for its age the issue was still unresolved and could cause severe impacts in the industry if resolved after de facto standards were established.

A Different Note

It was a slightly refreshing note at an FJCC, where standards had become the latest in a long series of "buzz words," to hear someone speak against overzealous standardization efforts – in this case, F.H. Schultz of Comcet.

He argued that standards could serve to stifle development and innovation by locking the industry into one way of doing things too early in its history. There are already too many standards, he said, even if they are not formal.

"After all, RCA and Univac, and even Comcet, are basically building IBM 360s instead of effectively innovating new techniques," he said.

The choice of the industry is one of staying young, dynamic and willing to experiment, or to adopt set ways that could stifle some development, he added.

The usual reference to software that would make systems transparent was made, this time by C.R. Blair, of IBM. In addition to more reliability and availability of services, and, of course, lower cost, he said that the problem of making systems invisible to the user would be the main one of the '70s.

One new twist was added by F.E. Heart of Bolt, Baranek and Newman, who outlined the advantages of resource sharing that will become available through such systems as the network linking 12 computers his firm implemented for the Advanced Research Projects Agency, Department of Defense.

The possibility of vast networks of computer systems freely tapping the resources and specialities of other members is exciting, one attendee said later, but, he added, it sounds ominously like the phantom computer utilities that everyone is "supposed to be using today."

N. Abramson of the University of Hawaii, put the whole issue in a nutshell by declaring that the major problem and challenge of the '70s would involve economics.

It is technically possible today to implement almost any system that has been imagined and to solve most of the major problems, he indicated, "but you have to be willing to pay."

Real DP Crime May Blossom

HOUSTON – The computer field must become increasingly aware of the possible use of computers in crime, according to Dennis Van Tassel of the University of California, Santa Cruz.

Addressing an FJCC session, Van Tassel said: "The instances of computerized crime are relatively rare on a scale with other types of larceny, but the instances could increase if precautions are not taken now."

Critical areas pinpointed by Van Tassel include "payroll manipulation, credit card fraud, bank embezzlement, securities juggling, theft of computer equipment and the illegal copying of computer programs."

Van Tassel warned that the computer serves only as a tool to carry out criminal activities and should not be used as a scapegoat accepting the blame for the crime.

The procedures used for these dishonest ventures require a highly skilled, highly technical mind, and, obviously, familiarity with the workings of the computer.

"The potential for more frequent and dramatic computerized criminal abuses, however, becomes a threat to be thoroughly considered as more people become highly skilled in computer technology and become aware that computerized larceny has several advantages over regular larceny, because it is seldom discovered and usually difficult to prosecute when it is discovered," according to Van Tassel.

"In the area of stolen computer equipment, there has always been a good market in hot computer gear such as cards, tapes, or disks, but because of their size, stolen computers have only recently entered the picture."

As computers decrease in size, this area is bound to grow, he said.

"Another possible area for the computer criminal is in the area of stolen computer time. In late 1968, for example, the Chicago Board of Education accused five employees in its Data Processing Bureau of setting up their own DP firm while using the board's equipment during slow hours.

File Standards Emphasized

HOUSTON – File description and translation will become more important, as people are "removed" from the computing process by telecommunications, some experts claim.

Removal of the human element will necessitate the translation and exchange of data bases, according to the consensus of attendees at the meeting of ACM's Special Interest Committee on File Description and Translation (SicFidet). The Rice University confab was held over a two-day period, and members for all over the country, and Europe, were in attendance.

One member said he was "proud" of the diligence of SicFidet, particularly since data bases, large systems, and file management were becoming major issues to the computer community. Nearly 100 attendees took part in the workshop.

Exchanges of data base systems among different, albeit compatible machines, was seen as one goal of such translation efforts, although all attendees agreed that the "casual Cobol programmer" or "typical user" would probably not get involved in such exchanges.

Puppet Show Draws Crowd

Honeywell's puppet made from electronic components and a sharp looking model from Houston drew crowds into the exhibit on both sides of aisle like honey draws flies. Honeywell had its standard exhibit including minicomputers and on-line time-sharing terminals.

Hardware Overview

Compatibility and Enhancements Are Themes, Few New Products

By a CW Staff Writer

HOUSTON – Among the hundreds of exhibitors at FJCC, more than half displayed products oriented toward the OEM market, and few new end-user devices were shown.

IBM's 370/155 was one of few large mainframes shown for the first time, but it was not introduced at FJCC. The main end-user products seemed to be the core replacements premiered by Lockheed and Fabri-Tek.

Key-tape devices were shown extensively, and received a great deal of attention. Several companies also showed new cassettes; one even modified a successful terminal with a cassette capability, thus having another "new product" to display.

The company stated it would have been just as easy to announced a cassette option for the terminal, but chose the "new product" approach.

A young company introduced a new technology for display terminals, but its products are currently aimed at the OEM market, with end-user sales anticipated in the future.

The company, Optel, introduced a display terminal built around a "cathodochromic" device, called a "Reflicon" tube, which it says will receive, store without power, and display directly or by reflection.

The unit is also designed to erase upon command TV-type picture or computer-generated data, graphs, or alphanumerics transmitted at rates up to 500 char/sec. Hard copies of the displayed information are possible, Optel said.

XDS "Cross-Breeds"

In showing its Universal Time Sharing (UTS) system for the first time, Xerox Data Systems also proved that a foreign (Sony) television set can be used successfully as a color CRT terminal display. It was interfaced to an XDS keyboard.

A cross-breeding with other manufacturers' terminals was evident throughout the exhibition hall, with companies admitting – even announcing – the fact that a colleague's terminal was compatible with their systems.

One system that is generating user interest is the off-track betting system introduced by Computer Sciences Corp. (CSC).

The system allows bettors to "invest" in any of several races, tracks, and betting denominations, and is scheduled to go into effect in New York City early next year.

Memories Are Made of This

Signal Galaxy's flux ring memory, previously announced, was shown for the first time at the FJCC. The new magnetic batch-fabricated memory technique is made from planar arrays of magnetic thick film elements.

The stacks require lower drive currents than plated-wire memories, and are reportedly less expensive than cores, with faster complete cycle times, and high packing densities. The company said the units show no deterioration of performance because of aging. They also are non volatile.

Semiconductor memories were shown, but most were aimed at the OEM market.

One minicomputer using this technology was on display. Although it was previously announced, the Four-Phase system IV/70 was seen in public for the first time at FJCC.

Some companies appeared wary of large investments in product development, or were not ready to show certain items, and concentrated instead on enhancements to current systems. Peripheral printers, cassettes, and key-tape devices would be cases in point.

COM

Computer output will be easier to store, if the microform companies have their way. Although most direct-output-to microfilm (or fiche) products entail substantial investments, smaller photo-image devices or readers were also shown.

Some companies have introduced new products in the past two or three months, but apparently decided there was not enough consumer money around to warrant showing the larger items, and displayed proven products instead.

Indications from attendees substantiated this evaluation, as users indicated they were looking for better I/O capability for existing systems, or for more efficient memories, or for better communications capabilities. Thus, couplers, modems, and terminals were aimed at an appropriate audience.

Simulation Can Predict Traffic Flow, Help Select Signal Control Patterns

HOUSTON – Traffic control needs all the help computer simulation can give. Dr. Baxter F. Womack, of the University of Texas, believes "simulation can be used to predict traffic conditions" and can help in the selection of traffic signal control patterns.

Womack, addressing a session at FJCC, described a computer model that reconstructs the events which lead to driver frustration and traffic snarls by simulating the traffic flow of a hypothetical intersection.

Through simulation, he stated, it is possible to model the actions taken by the driver of each vehicle in the system as the vehicles move.

This is accomplished by first prescribing the driver's actions in response to several sets of inputs available to him concerning the roadway and traffic situation, he said.

The driver's actions are then determined for each particular combination and for each increment of time.

Driver Response Predicted

By simulating traffic conditions in which vehicles enter the network at a specific speed, lane approach and time, Womack stated that it has been possible to create a model in which driver response and the resulting effect on the system can be predicted.

Each driver response, such as acceleration or deceleration creates a new condition for that particular vehicle and alters the relationship of all the vehicles in the system at that particular moment in time, he added.

The model was constructed to initiate the simulation of events and the driver's response at the moment the vehicle enters the system, and the simulation continues until the vehicle leaves.

Pres. Nixon Pats Afips

HOUSTON – The Fall Joint Computer Conference received the support of the White House, as President Nixon wished Afips "sustained success" in the "contributions your programs continue to make to [the data processing industry's] technological progress."

FJCC Quickies

The Houston Post surveyed the FJCC exhibit floor and found girls still attract guys, in spite of Afips' edict to exhibitors "Let's be academic and scientific." The local newspaper came to a conclusion that computer people must have something. To quote the *Post*, "At what other convention in the world could three thirsty conventioneers stand at a broken beer dispenser and calmly talk of the merits of putting the beer business on a computer?"

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One DEC PDP-11 proved its sturdiness before the FJCC opened when it worked after being dropped – probably when being off-loaded from a Delta Airlines cargo flight. The system, owned and exhibited by Tennecomp Inc. which produces a compatible cassette transport, was bent along the frame and some wiring was shaken loose. In fact, "it looked like someone had jumped on it" according to Bob Borshay, a Tennecomp spokesman.

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Afips insured the Houston conference against possible failure to be held due to fire or other uncontrollable acts for over $500,000.

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At Rice University, the computation center is planning to upgrade from their Burroughs 5500 . . . the Fortran compiler had given sporatic problems over the past two years but university users now say most bugs have been eliminated.

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Many exhibitors, operating hospitality suites in the Astrodome at last week's FJCC were disappointed at only one aspect – the potential electric bill. Those who wanted to turn on the lights over the field as part of their hospitality were dissuaded early – the cost of $42 per minute seemed prohibitive.

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Southwestern Bell Telephone said the "monumental" installation task involved in setting up data transmission facilities would result in "far more communications facilities than any convention ever held here." A telephone company spokesman said that about 450 voice and data lines and about 15 dedicated, point-to-point special lines originated at the Astrohall.

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One minicomputer salesman received quite a shock when a customer told him half way through his presentation: "I'll take it for my house, now."

Even though the conference rules prohibit selling from the floor of the convention – more honored in the breach than by adherance – an agreement was worked out and the system will be delivered along with the household furniture when the man moves into a new house.

Total cost: $8,000 with peripherals. Designers take note: The customer was particularly impressed with the color scheme.

Ah, Texas!

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Some educational users indicated last week that the generous gifts given to educational institutions by mainframe manufacturers might not be all they are cracked up to be.

"They gave us quite a bit of equipment that they couldn't get to work – and most of it is still unworkable" one said. Of course if problems with the equipment are solved, the manufacturer would probably reap the benefits.

However, the situation is not all bleak. "It's almost as much fun to work on these clinkers as on working systems – in fact sometimes it's more fun and more educational," another user said.

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Bachelors take note! The education sessions at these conferences seem to draw the best looking female attendees, according to an informal survey by soon to be married CW staffer.

The reason is obvious – they're drawn from the local school districts, and pretty teachers seems to be one of the major new educational trends that is worth keeping.

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The cost of making session signs for FJCC was $6,000. The main problem was getting times and dates of the meetings in order to get them printed and up. Then they had to be spotted all over the meeting places at the task for the local committee which worked 1-1/2 years to put the conference together.

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The Broad Perspectives Session on "The Payoff From System's Performance Analysis" was a strangely unbroad perspective in that it extolled one commercial company's approach to system performance analysis and had no breadth.

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It was a dry week in Houston . . . not in the "private clubs," . . . but under clear, warm skies. No precipitation was recorded, and temperatures were generally in the 60s during the day.

At the beginning of the week, near-freezing temperatures were recorded, but by Tuesday, "more normal" temperatures of 51-72 prevailed.

Afips Plans Investigation To License DP Professionals

By Phyllis Huggins
CW West Coast Bureau

HOUSTON – Afips is looking into the problem of licensing computer personnel for several reasons, one of which is that it believes DPMA alone cannot do an adequate job.

As Don Parker, chairman of the Afips Ethics and Certification Committee, put it: "If they had stayed with licensing technicians they would have been all right." It is Afips' opinion that the DPMA has fallen down on the higher professional levels.

The other reason is that individual states, primarily California, and Congress, are breathing down the profession's neck as they instigate committees to look into the licensing problem.

This interest by government has been stimulated by problems in the use of computers for vote counting and for data banks that store information considered private to individuals and business.

Afips' approach is to hire a private consultant, Ray Berger of Los Angeles, to first define what the jobs in the industry are. Once this has been done it can be determined who is actually in the industry and responsible to what degrees.

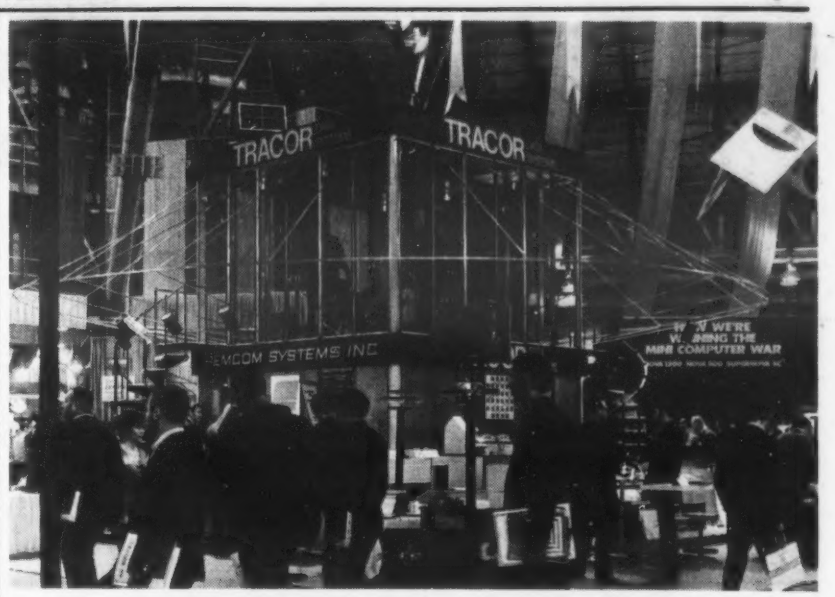
A meeting will be held in January to go over this first step of his research into the problem.

A California legislator said that licensing usually comes about because of pressure within a profession, and that if any major society would object to it, it would be dropped like a hot potato.

Pressure within this profession is mixed as the polyglot interests of computer people do not adapt well to any rigid structures. At the same time a need is recognized to protect public and private business interests.

Robert Patrick, a consultant, is pushing in the direction of licensing installations. This would mean that certain groups would be privileged to handle sensitive data such as vote counts and privacy information. Licensing would require security protection of the entire operation.

Parker concluded by saying that whether the computer community likes it or not, society is forcing licensing upon DP people.



Ready for the Moon

Definitely the most aesthetically pleasing, Tracor's exhibit featured TDS 1255 time-sharing systems, in addition to semi-separate displays from Tracor affiliate companies, Peripheral General and Remcom Systems.

Modular Programs Form Key to Graphics

By E. Drake Lundell Jr.
CW Staff Writer

HOUSTON – Successful implementation of computer graphics systems depends on clear definition of the application area and the development of reusable program segments, the ACM seminar on computer graphics was told here last week.

John Brackett, speaking to the Special Interest Group on Graphics (SigGraph)-sponsored meeting, said software costs on a graphics system would generally run five times greater than the hardware investment.

Graphics applications should only be programmed in the higher level languages and all graphics application programs should be written in a modular fashion, Brackett noted.

He indicated that the extra costs associated with higher level languages (more core requirements, etc.) would be more than offset by the reusability of components of the package.

In the future, he indicated, there would be a need for more device-independent languages and applications in the graphics field.

To develop such systems, Brackett said, all of the standard functions on a graphics display should be clearly defined so that they could be identified from the terminal.

Procedure calls then could be implemented to meet the specific functions of each terminal.

In the argument over whether most of the functions of a display should be implemented in hardware or software, the panelists agreed that as many functions as possible should be incorporated in the hardware.

"We really haven't learned how to make the programs transparent to the user," Brackett said, adding that this would impede any widespread use of computer graphics.

Advice to Potential Users

Brackett advised potential users to buy relatively inexpensive terminals at the start and not to upgrade until the original equipment was fully exploited.

He noted that the user would be able to save on initial programming costs this way and develop some experience with graphics programming before attempting the more complex systems found in the higher price ranges.

Another seminar leader told the attendees the computer manufacturers to date "haven't done anything intelligent" in the area of software for graphics systems.

He also indicated that it was probabaly cheaper for most users in the long run to have their graphics systems – both hardware and software – developed on a "turnkey" basis, especially if they did not have a lot of experienced graphics programmers on their staffs and if their application areas were well defined.

Once a user installs his first graphics system, Brackett said, he should be very careful to justify the costs before going on to any more specialized applications.

The user might not be happy with the cost justifications, he noted, but that indicates that the system is not being implemented correctly or that the application is not amenable to graphics systems.

A lot of systems built by programmers, the seminar leaders said, are not really usable in the real world. Most of the prospective users today have become pretty mature, they indicated, and need more usable packages than are currently available.

The seminar speakers stressed that an important factor in implementing graphics projects is to limit ambitions – to do small projects well before being dazzled by the large, blue sky schemes being planned by some firms.

Technical, Legal Experts Are Must for DP Contract

HOUSTON – Boston attorney Roy N. Freed last week called for a coordinated team effort of computer specialists and legal experts in contracting for computer use and computer services.

"Because of the complexity of computer-communications technology, often attorneys do not possess enough technical knowledge to draft a meaningful computer contract," Freed told a conference session.

"For this reason, the computer specialist and legal expert must work closely together to draft contractual agreements that are meaningful, pertinent, and reflect the needs and positions of suppliers and users."

"The concrete impacts of bad contracts have been great," Freed pointed out. "Suppliers have been subjected to large awards of money damages from severe disruptions of their computer operations.

"In addition, the improvident transaction frequently hinders the progress of technology or delays its proper use. Potential users justifiably can become wary of using computers, based on reports of difficulties encountered.

"Until recently, the contents of contracts used in the computer industry appear to have been influenced largely by marketing people. Many of the form documents avoided detailed statements of the subject matter involved. And a large number reflected the greater bargaining power of the supplier," Freed said.

"Because of the time and expense involved in introducing a computer system, contractual agreements must assure that the suppliers will respond adequately to largely unpredictable needs for increased volume and a variety of services, will handle catastrophes with genuine concern and will protect critical information from unauthorized disclosure," he said.

The computer specialist, Freed said, must advise the lawyer in such areas as the nature of a customer's needs; the technical aspects of the products or services considered to fill these needs; and the types of business approaches available to secure those products or services.

The identification of factual aspects that require treatment in negotiations and the interpretation to the lawyer of the significance of these aspects should be the responsibility of the computer specialist, he added.

"Computer specialists must also take considerable initiative in performing their function. They must identify points requiring treatment frequently without guidelines from the lawyers and then they must persuade the lawyers, if necessary, that those points are important.

'No Great Feat to Wiretap' Says Canadian Computer Professor

HOUSTON – "Modern computers, with dozens of remote terminals are becoming increasingly like communications networks – and they are subject to the same problems as your telephone," Dr. John M. Carroll told a conference session.

"There exists the risk that information belonging to one user, may, contrary to his intent, become available to other users, and there is the additional risk that outside agencies may infiltrate the system and obtain information."

Carroll, associate professor of computer science at the University of Western Ontario, said, "It's no great feat to wiretap a computer.

"We have done it with a portable tape recorder. That's why Phil McLelland and I developed a cryptic system to safeguard confidential data residing in computer files." McLelland, with Sperry Rand Univac Ltd. of Canada in Ottawa, wrote the computer programs for the system.

"Basically, the cryptic system makes up its own one-time tape as it goes along. The one-time tape is a kind of cipher used for high-level diplomatic traffic," Carroll said.

"The tape is effectively endless and the varieties of code just about inexhaustible. You just give it a new starting point each time and the computer program takes over from there."

The system uses no special equipment or code books, just the computer's own arithmetic capability. All data resides within the system and can be destroyed almost instantaneously.

"If the Pueblo had been using a system like ours, the crew would only have had to pull a switch to prevent the code books and information processing equipment from being captured," Carroll said.

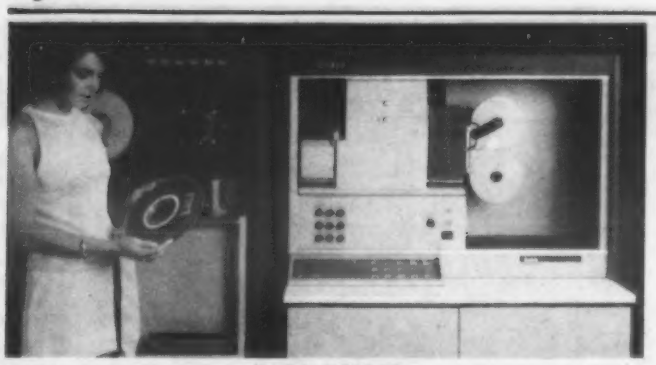
Prison DP Plan OKd

OKLAHOMA CITY, Okla. – The state Board of Corrections has authorized a pilot project to train McAlester State Penitentiary inmates in computer programming.

Programming Resources, Inc., developer of the project, anticipates teaching 20 to 25 inmates every year, with about 10 or 15 students completing the course.

Prerequisites for enrollment in the course include: that the convict have six months to two years to serve, a high score on the computer aptitude test, and satisfactory social attitudes.

After four months of initial training, the inmates will be drafting programs for firms, thus continuing their training and earning money.



Kodak KOM-80

Kodak's KOM-80 Priced Lower Than Previously Available Units

HOUSTON – The Eastman Kodak Co. introduced, at FJCC, the KOM-80 COM system that can operate at any of three speeds, with a base price significantly lower than the company's earlier KOM-90 system.

The new KOM-80 is available in three models, Mod 60, Mod 90, and Mod 120 with rates of 60,000 char/sec, 90,000 char/sec, and 120,000 char/sec.

Adding to the versatility of the new system is the Versaform camera, which allows the KOM-80 to use 35 mm, 70mm, 82-1/2mm, or 105mm; in addition to the more familiar 16mm films as an output medium.

However, the inability to record one line at a time seems to place the unit at a disadvantage. Limited to recording a whole frame, the Kodak KOM-80 system therefore has a longer "pull-down" (frame advance) time.

Mag Tape Conversion

The KOM-80 converts computer data from magnetic tape into images which are displayed on the face of a CRT and photographed. The operator can superimpose standard business forms on the microfilm, making the final image easier to interpret, Kodak said.

Input is a 9-track, phase-or-NRZI-encoded tape, using IBM 360-compatible Ebcdic code. Either 800 or 1,600 bit/in. densities can be used. This allows 5-track images from 35mm roll systems, permitting storage capacities of up to 36,000 pages on one 100-ft roll of film, Kodak said.

Image format is compatible with most line printers at 132 char/line. As many as 64 lines can be recorded per frame. Reduction ratios up to 42:1 are possible.

Regular, italics and boldface type may be intermixed within a print line. A basic library of 64 characters is provided and can be expanded, as an option, to 82 characters.

The KOM-80 provides three different retrieval coding methods. Image control is standard, with code line indexing and coding for the Miracode System optionally available.

Any two of four available modes of operation may be selected by the user. These include cine, comic, reverse cine, and reverse comic.

Kodak will provide software support for the KOM-80, which will, according to the company, simplify both the conversion of existing programs and the development of new ones.

Initial deliveries of the KOM-80 are scheduled for May 1971.

The KOM 90 sells for $89,000, with a basic 16mm camera, but no processing or tape drive. The unit leases vary, from $2,200/mo for five years, up to $2,650/mo for a single year.

The new KOM 80 leases for $1,550/mo, with a standard camera. There is no announced purchase price as yet.

Kodak also announced a microfiche reader, the Recordak Signet 1511, that can take advantage of some of the format flexibility of the KOM-80. The device is capable of 42X magnification, allowing full-size EDP forms to be projected.

Kodak's main offices are in Rochester, N.Y.

In-House Time-Sharing Suited For Four 1648-Based Systems

By Frank Piasta
CW Staff Writer

HOUSTON – Honeywell's Computer Systems Division has expanded its 1648 mini-based time-sharing system into a series of four, compatible low-cost systems.

The series, the H1640 Time-Sharing System, is comprised of the H1642, H1644, H1646 and H1648A. The systems are intended to encourage the commercial T/S services user to install his own in-house system.

Low cost and the ability to handle up to 64 simultaneous inputs, an extensive library of applications-oriented software, and a choice of up to eight languages are intended to give the small time-sharing system much of the flexibility offered by the larger commercial T/S services.

The availability of multiple compilers for the time-sharing user may be the chief advantage of the H1640 Series over the Hewlett-Packard 2000B, which appears to be Honeywell's chief rival for the small T/S user's attention.

The HP system offsets the multiple compiler advantage somewhat by offering a larger group of batch-oriented languages.

Disk Storage

Another advantage of the Honeywell series is in the amount of disk storage available to the user. Even the smallest model can have as much as 36-million words of storage.

DEC's TSS/8 is also a similar low-priced system that offers the user less performance, but only 4K of memory is available to each user, and the amount of disk storage is small.

On a language basis, the TSS/8 compares quite well suggesting the DEC system might be better for applications, such as schools that require a low price and flexible software.

H316 Minis

The H1642, H1644, and H1646 each include two 16-bit H316 minis with a cycle time of 1.6 μsec.

The H1642 can handle as many as 16 simultaneous users and individual programs can be as long as 10K each.

The basic H1642 configuration includes a Model 4720, 200-track 14.4-million character disk and rents for $4,250/mo. File update can be handled however, when a magnetic tape unit is added to the system. A basic H1642 will rent for $2,995/mo, Honeywell said.

The H1644 includes 16K memory for each user program, with with required software.

The H1646 adds random file access, as many as 960 users, up to 93.6 million words of user file storage, and password-coded files for double protection.

Each of the two processors on the 1646 contains 32K words of memory. As many as 48 simultaneous users can be accommodated. Lease prices start at $5,550/mo.

1648A Most Powerful

The most powerful member of the family, the H1648A is composed of two DDP-516s, with 32K words of memory to be used as the job and control computers, and a 4K DDP-416 to act as the communications computer. The cycle time of the 16-bit CPUs is 960 nsec/word.

The H1648A can serve up to 64 simultaneous users and supports random files. Hardware floating point is available and up to 115.2 million bytes of random access storage can be provided.

The rental for a basic system is $7,815/mo.

Software available for all 1640 series models include: Basic, Fortran IV, DAP-16, Solve, Teach, Edit, Chaining and Public Library.

As many as four tape drives, rated at either 26 or 80 in./sec,, can be connected to an H1640 system. Line printers rated at 300, 650, and 950 line/min are available. Card handling is furnished by an 800 card/min reader, or a reader punch that reads or punches at up to 400 card/min.

First deliveries of the H1640 systems are scheduled for February 1971.

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Another Core Choice for 360s

HOUSTON – Fabri-Tek, Inc., a producer of core memories for computer manufacturers, now offers memories directly to 360 users.

The new Mod 30+ memory will upgrade 360/30 computers from 16K bytes to 96K bytes as plug-in replacements for IBM core. The system was unveiled at the conference.

Fabri-Tek 360 Core Replacement

Mod 4+ and Mod 50+ memories will upgrade existing 360/40 and 360/50 processors, the company said.

Fabri-Tek offers full maintenance.

The systems are available, leased or purchased, at savings of 20% compared to IBM pricing, the company said.

Fabri-Tek said the savings could be enhanced with higher usage, since there are no clocks on its replacement model for IBM core. IBM's pricing policy adds a penalty after 176 hours of use per month, then another premium after 352 hours, the company said.

The Model 30 replacement costs $38,400, or can be leased for three years at $900/mo.

Hazeltine CRT Display Has Hard Copy Option

HOUSTON – Hazeltine Corp.'s new printer unit has a choice of hard copy printing options for use with the Hazeltine 2000 video display terminal. The unit may be operated on-line or off-line at an I/O rate of up to 30 char/sec.

The unit is offered on a 12-month rental for $78/mo, including maintenance.

Hazeltine is located in Little Neck, N.Y.

Tech Notes From FJCC

Graphics Division, Gould Inc. of Cleveland, has a new wider model of the Gould 4800 high speed electrostatic printer/plotter which is 2-1/2 in. larger with an 11 in. wide, 132-column format.

Custom-designed interfaces between the 4800 and major mainframe computers are now available also.

– – –

Genisco Technology Corp. of Compton, Calif., has a new cassette tape memory, the ST-2-12 Minicorder, designed particularly for General Automation SPC-12 users. Over 1.6 Mbits can be stored on a double width track organized into 1,536 blocks each containing 1,024 bits.

– – –

Inforex, Inc. of Burlington, Mass., has added two features to its Intelligent Key Entry System. A 1,600 bit/in. phase-encoded tape drive can be supplied with the Model 1301 Inforex control unit. A Second Balance Register can also be added for users who require added arithmetic capabilities.

– – –

Precision Instrument said it has finished its long-time development of the new Unicon laser mass memory system and has now completed the first production unit.

– – –

The 4300 Magnetic Data Recording System by The Singer Co.'s Friden Division has new data transmission capabilities.

A modular key-to-tape system, the 4300 now has the capability to transmit data at a rate of from 600 baud to 9,600 baud, depending on the capabilities of the selected modem. This allows a user the flexibility to capture data in either 7-track (200, 556 or 800 bit/in.), or 9-track (800 or 1,600 bit/in.).

Printer, Memories, CRT Terminal Added to DEC PDP Peripheral Line

By Michael Merritt
CW Staff Writer

HOUSTON – Digital Equipment Corp. introduced a new group of peripherals for the PDP family at the FJCC, including a printer, tape and disk devices, and a CRT terminal.

The star of the group is the LA30 Decwriter, a dot matrix impact printer that operates at 30 char/sec. This is three times the speed of the familiar Teletype KSR 33 and 35 which the LA30 is designed to replace in on-line printing applications.

The Decwriter, said to be much quieter than a TTY, is an electronic rather than a mechanical device and uses ordinary paper instead of thermal or electrostatic stock, DEC said.

The company has no immediate plans to equip the Decwriter with a modem and paper tape unit to make it a full TTY replacement for communications applications, "though it is possible," a DEC spokesman said.

The LA30 is priced at $2,500 and is scheduled for delivery late next spring.

The TU10 DEC magnetic tape drive uses Ascii code and is available in either 7- or 9-track models. The 7-track version can handle 200, 556, or 800 bit/in. packing densities, while the 9-track model operates at 800 bit/in. only. The 45 in./sec vacuum column unit sells for $6,950 without controller. A controller for the PDP-11 costs $3,000, while the PDP-15 costs $6,950.

The TU10 magnetic tape drive is plug-to-plug compatible with the DEC TU20 model presently used, and has a transfer rate of 36K char/sec.

A fixed-head disk storage unit that offers fast random access to data is also available for the PDP-11. Called the RS64, it can store 64K word/disk.

The word transfer rate of the device is 16 μsec/word, with an average access time of 16.9 msec. Cyclic redundancy checks are performed on a block basis, DEC said, and a maintenance feature allows the PDP-11 to simulate all signals to the control unit for diagnostic testing.

The price of the control unit is $6,950, including one drive. Additional drives (up to four) are priced at $4,500 each.

A new Teletype-compatible CRT terminal, the VT06, is said to display data 24 times faster than electromechanical terminals and is noiseless.

The 10-in. screen of the unit has a capacity of 25 lines of 72 characters each.

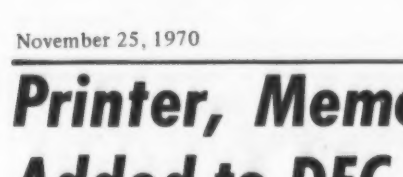
The terminal keyboard is similar to the Teletype ASR33, with the addition of a 10-key adding machine-type pad.

The cost of the VT06 is $4,900.

PDP-11 users will have available a cartridge disk pack drive with a capacity of 614,400, 16-bit words. Each controller can handle as many as four drives, permitting the storage of 2.4 million words.

The price of the basic unit, consisting of the controller, one drive and one cartridge, is $12,900.

Following the trend of most of the exhibitors, Digital Equipments' booth was of unpretentious design as illustrated by this view of the PDP-11 side.



The Decwriter Printer

Memorex 1280 For Data Entry

HOUSTON – The Memorex 1280 cassette communication terminal, announced at FJCC, offers data transmission speeds up to 120 char/sec and data storage of 180,000 characters on the cassette.

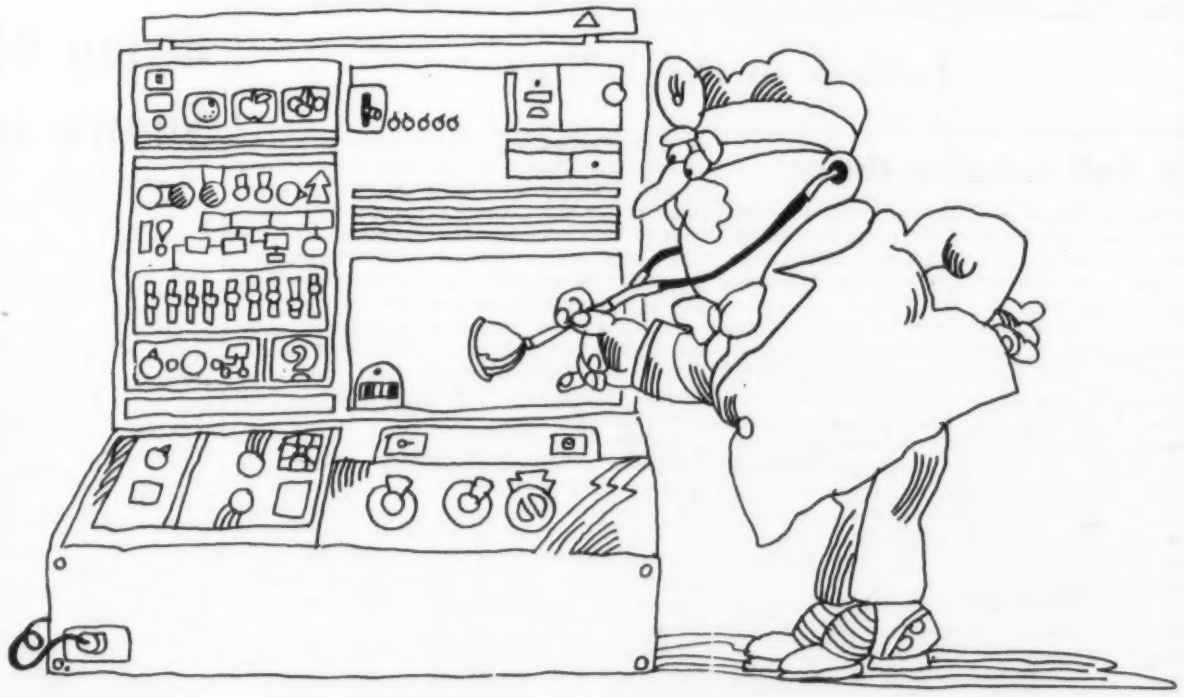
The 1280 is designed as a data preparation and data entry terminal in high-volume applications such as sales order entry where a day's information can be entered and stored in the cassette for transmission at a convenient time to the computer.

The terminal is the latest addition to the Memorex 1200 communication system announced earlier this year.

To facilitate data preparation, the 1280 offers a range of editing functions, including: character insertion and deletion, line insertion and deletion, and line expansion. The optional auxiliary numeric keyboard is arranged in office machine format to facilitate entry of numeric data.

The 1280 has selectable printing speeds of 10, 15, 30, or 60 char/sec, 94 printable graphics, and a 120-character printing line. A removable form tractor provides a range of forms handling capability.

The 1280, available for deliveries in the second quarter of 1971, is essentially a 1240 with a "cassette feature upgrade," the company indicated. It can be rented for $180/mo, or purchased for $6,100 with up to 30 char/sec print speeds. The 60 char/sec capability can be rented for an additional $25/mo, or for an increase of $875 in the purchase price.



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Editorials

FJCC Weathers the Storm

Considering the depressed economy, the Fall Joint Computer Conference did exceedingly well – and in some ways was the most satisfactory joint conference held in recent years.

Attendance was good. The loss appeared to be almost entirely in the "exhibitor guest" category, not in paid conference registration.

On the negative side, the conference put little or no emphasis on the latter part of its theme of "Systems and Society," but hopefully this will be corrected at the next two conferences. The theme of the spring conference will be "Responsibility" and of the fall conference, "Computers and the Quality of Life."

The conferences have often been called carnivals. This, the first held in a circus tent (the Astrohall has a red-and-white striped dome roof) was the least circus-like. Afips had banned the girls and the gimmicks.

The next step might be to insist that at least 50% of exhibitor personnel be technical people.

Letters to the Editor

L.A. Staff Praised on Election

Several weeks ago you published an article saying that in Los Angeles County the American Independent Party and the Peace and Freedom Party were in need of an EDP election observer, but were unable to find one.

As a result of that article, Corporate Data Processing, a Los Angeles service bureau, contacted the parties and offered its personnel. The Peace and Freedom Party accepted the offer.

I was assigned to the IBM 360 used for vote counting. Observations were that the entire process (manual as well as computer) was well planned and orderly in its execution. Knowing that you and your avid readers would be highly interested in any election irregularities, I kept my eyes peeled and found one: a tape label had been attached upside down.

Although there were several minor points re procedure, there is no question that the Los Angeles County staff did a nice job.

William R. Thornton, CDP

Corporate Data Processing
Los Angeles, Calif. 90026

Programmer Licensing: 'Cop-Out'?

I feel compelled to comment on the increasing cry for licensing and regulation of the "computer industry" and computer technicians, especially programmers, [CW, Taylor Report, Nov. 11] "The Question Arises: Who Will Control DP Problems?"

Two distinct problems are being addressed by those who advocate regulation:

- Improper use of accumulated data. These are primarily questions of privacy, security, and accuracy and are only indirectly the responsibility of the computer industry.

The problem has always existed; the introduction of the computer simply made the problem larger and more apparent.

Regulation is required for those who employ computers, not the computer industry.

- Inadequate or irresponsible systems design and implementation. Again, data processing technicians are not the responsible parties.

Would it not be foolish to license bartenders in order to halt drunk driving? It is equally ridiculous to license programmers in order to correct the sins of their employers.

If management fails to define adequate and consistent objectives and to insist on translation of their policies into the computer and clerical systems, it is not the responsibility of the programmer or computer operator to correct this deficiency.

To insist otherwise is to invite anarchy. While the technician has a basic human responsibility to question "antisocial" objectives, it is not his position to refuse to implement them, simply because he may not be aware of the entire situation.

Those who would attack programmers fail to understand the nature of programming – the translation of procedures (ways of doing things) into an extremely precise language.

The fact that the procedures are inadequately or inaccurately defined is not the fault of the programmer. The overworked cliche "garbage in, garbage out" applies to the programming process as well as to programs.

Attempts to license DP technicians represent a subterfuge, a "cop-out," attacking a disease by its symptoms, not its cause.

However, the DP community has failed to face up to its educational responsibilities, to provide its attackers with the knowledge to challenge the real problems, and thus to dissolve the protective curtain of "computer error" that excuses all wrongs.

Regulation of the computer industry will simply add a layer of bureaucracy to an already complex problem.

Roger M. Loeb
Manager, Research & Development

Neodata Services
Boulder, Colo.

Basic Also for Skilled User

Re: "Basic Standardization Proposal Gets Mixed Reviews" [CW, Oct. 28].

Certainly there could be advantages to standardization of the Basic Language, but in my mind the principal ones do not and should not center around protecting its role as a "beginner's language."

As a member of the time-sharing community who "grew up" with Basic and still uses it extensively, I would like to propose even more power for the language and one standardized version which includes all the desirable enhancements.

The current state of Basic with the available extensions offers great flexibility to the novice or to the skilled user. The powerful enhancements do not disturb those elements of the language which make it an effective educational tool, yet they are available for producing efficient and sophisticated programs for a multitude of applications.

Having used several versions of Basic and its extensions for applications ranging from payroll preparation to inventory control, I would be sorry to see anything but a total tool standardized.

William P. Gates
Comptroller

Pressure Systems, Inc.
Los Angeles, Calif. 90022

Rising DP Training Costs Shown in Study of Firms

WASHINGTON, D.C. – EDP training is big business – and it's getting costlier each year. Leading U.S. business and industrial firms, life insurance companies, and banks gave credence to that fact when surveyed by Wiley Systems Inc. of suburban Bethesda, Md.

Wiley conducted the survey as the first part of a six-month, $30,000 contract with the U.S. Forest Service of the Department of Agriculture. The survey was designed to compare industry and forest service EDP training and experience.

D.C. Data-Line
By
Alan Drattell

One hundred and three firms were part of the compilation.

Three areas were covered: training expenditures, training duration, and experience of EDP personnel.

Companies were asked two questions on the topic of training expenditures: What percentage of overall EDP expenditures was used for EDP training during the past three years? What was the average cost per man-day of EDP training during the past three years?

The results showed EDP costs rising on both counts.

For the years 1967, 1968 and 1969, the percentage of firms reporting training costs under 1% dropped from 61% to 52% to 40%, respectively. For all training costs greater than 1%, the survey shows increasing percentages of firms in each range from 1967 to 1969.

Some respondents said costs were expected to increase for 1970 because of unbundling by major computer manufacturers.

On the cost per man-day, the percentage of firms reporting training costs under $5/day dropped from 44% in 1967 to 27% in 1969, while the percentage of firms spending over $10/day jumped from 41% to 58% in the same period.

The survey also delved into the average number of days per year EDP control clerks, keypunch operators, programmers and analysts and DP managers attended training courses. It found that the higher the position, the more likely the training day program would be.

Training of EDP control clerks, for instance, amounted to less than two days per person per year in 62% of the responding companies.

Results were the same for keypunch operators in 65% of the companies, while 65% of the responding firms provide five or less days of training per person per year for computer operators.

Over eight days of training for programmers and analysts are provided by 56% of the companies, with only 20% providing five or less days.

Survey results for the training of DP management people fall into three areas: 34% of the firms provide five or less days, 27% between five and 10 days; and the remaining 39% over 10 days.

The third area covered in the survey was experience and education of EDP people – again from control clerks to DP managers.

EDP control clerks, keypunch operators, computer operators, and programmers and analysts averaged between 72% and 77% of four years or less EDP experience. Employer loyalty dipped sharply among the programmers and analysts.

For DP management, the results were strikingly different. Ninety-seven percent of the companies said their DP management had an average of over five years' EDP experience – and in 66% of the firms, DP managers had over five years experience in the same company.

Explanation of What Was Behind the $64 Question

Nothing comes from nothing, and certainly when dollars are being given away there is generally something quite solid behind it. There certainly was in the case of the $64 Isam Question Contest [CW, Taylor Report, Oct. 14].

It all really started in the summer when, while writing about the Cobol overheads, I started getting complaints from people who said that Cobol was no worse than various other software items. These Cobol defenders had a case, I knew.

The Taylor Report
By
Alan Taylor, CDP

But at that time I was unable to deal with it because I did not have any appropriate evidence.

Course Produced Evidence

Indeed I was only able to deal with Cobol because I had discovered a course which produced "before and after" effects. It was a Cobol Optimization Course which at that time was only on Honeywell Cobol.

(A new version of the course has now been introduced for IBM Cobol users, and, as a matter of interest, I find that the students who take the course are getting the same percentage improvements in the running time of their Cobol programs on the IBM systems that those from Honeywell systems did.).

It was the fact that these improvements existed that had allowed me to talk about Cobol overhead at all. As I said at the time we still do not really know what the Cobol overhead really is – but if a program that takes an hour is cut down to a running time of a half-hour and still produces the same outputs from the same inputs, then the original overhead was at least 100%.

The results of the Cobol course were the first acceptable evidence of "before and after" situations that I knew.

The result was that Cobol got fingered correctly regarding inefficiencies, but unfairly in so far as it was picked out from other inefficient systems.

This was soley because it is so much more manageable than the other systems that figures had, at last, been able to be produced.

Enter Amigos

With all this in the back of my mind I happened to go to a seminar on something called Amigos. Amigos is a new replacement for the IBM Index Sequential Access Method (Isam).

A commercial product which was then just being put on the market by Comress, it is one of the benefits that unbundling has brought to the industry.

The seminar went very normally to start with. There was the technical description of the files and how they were being played around, the assurances that it was simply inserted into the programs and was completely transparent to the programmers, and the history of its original development many years ago in the aerospace industry and improvement to various versions etc.

The speaker also reviewed the long background of Comress and its growing position in the software industry since 1962, all of which I listened to with interest but without intense excitement . . . until one of the speakers started talking about results, and started giving figures.

Before and After Figures

He was talking, for instance, of a program that lasted one hour and nine minutes with Isam and which was handled using Amigos in the nine minutes. He was talking of another 16-minute program that dropped down to seven minutes, the 30-second response time that became 10 seconds and of a three-minute program that dropped to seven seconds. In short, he started giving figures.

Figures do excite me and I began to see here a possibility of somewhat reducing the balance. Isam, in its own way, is as important as Cobol.

The number of users that either use it, or would use it if it had been efficient enough, was probably just as great as the number of users who use Cobol! So I went in afterwards and started investigating some of the claims.

I found that they were genuine. They were certainly test cases, but they were not tests that had been faked – at least I could not locate any such faking. They had taken place all over the country.

Some of the installations had taken Amigos, others had not. But the tests had not been specially set up to favor Amigos. They were simply runs which the users thought would be interesting to know concerning what Amigos could do – important runs, or alternatively runs where the users were already critical of Isam performance.

After having checked out the accuracy of the claims I worked out some of the overhead figures. They were incredible.

Remembering that overhead is the amount of unnecessary work involved divided by the amount of necessary work, then, for instance, the overhead on that one hour and nine-minute program that was reduced to nine minutes was 69 minus nine divided by nine or 667%!

Overheads of 100% were low! And this was with one of the most critical program products put out by our main source of software!

Do People Know?

I thought you would be interested in these facts – but I thought it would be even more interesting to find out first whether or not you really knew what was going on. I found out.

Those users who do know something about overhead were not particularly surprised. In the answers that were sent in overheads of 100%, 200% or 300% were quite common. But not many answers were sent in!

The situation is, then, that overhead is known to exist but no one is bothering very much. Except, of course, people like Comress with the Amigos who have a commercial reason for bothering.

Next week we will look at just how big the overhead really is, and talk about some of the answers that were given. In the meantime, if you use Isam, or if your installation uses it, why don't you find out whether you know what the overhead is and what it is costing you?

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Alan Taylor, consultant, writer, and former editor of *Computerworld*, is president of Computer Management Aids Corp. of Framingham, Mass.

Core-Saving Results

It is not often that things happen nicely, but Judy Packer's letter in the Nov. 11 issue of CW looking for a post processor reached me in the same post as the first performance figures on the only post processor of which I am currently aware that helps Cobol F users.

The processor concerned, the Capex Optimizer, had been testing core usage at various test sites, and I was sent the list of the program size, the procedure division size, the savings, and the savings worked out as a percentage of the program.

The savings varied from 5% up to 40% and, on the test sample, it looked as though large programs saved less than medium sized and small ones. The average of the 20 programs in the sample came to 15% which is quite a considerable saving. The Capex Cobol Optimizer core-saving results from initial test sites are:

	Program Size	Procedure Division Size	Core Saved	Program Saved
	43K	35K	15K	35%
	21K	13K	4K	19%
	69K	44K	11K	16%
	149K	61K	19K	13%
	176K	37K	11K	6%
	269K	51K	13K	5%
	12K	11K	3K	25%
	6K	6K	2K	33%
	126K	75K	29K	23%
	27K	19K	7K	26%
	77K	32K	7K	9%
	82K	40K	9K	11%
	26K	20K	4K	15%
	6K	5K	1K	17%
	140K	84K	32K	23%
	24K	23K	4K	17%
	30K	27K	12K	40%
	19K	16K	6K	32%
	48K	35K	8K	17%
	156K	107K	26K	17%
Range	6K-269K	5K-107K	1K-32K	5%-40%
Average	75K	37K	11K	15%

"We assume, of course, Mr. Johnson, that your personal views are not necessarily those of the FCC. . ."

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Just What the Homemaker Needs

SILVER SPRING, Md. – Thomas Prugh bought a computer instead of a yacht a year ago. "Many people," he explained, "buy yachts, fancy sports cars, or airplanes for off-hour amusement. I bought a computer for my project on 'home control.'"

Prugh is a government electronics engineer and has been near computers most of his professional life. "Although I have used computers as part of my work, I've always had a yen to really get involved with one. The best way was just to buy one." He owns a Digital Equipment Corp. PDP-8/L.

"I am tinkering with the prospect of having the computer monitor and control a number of points in the house. For instance, I am now figuring a way to tie the computer into the electronic controls of the garage door."

Among the most probable applications of the computer in any home, Prugh believes, will be monitoring and controlling heating, power and alarm systems; monitoring vital signs of ill members of the family; appliance control; and even home auto diagnosis.

Another emerging application, which he feels to be one of the most fascinating ones for the home, is telephone answering and call placing.

"But a more practical application is having the computer place calls in cases of emergency. In case of fire, or unauthorized entry, the computer could sense problems and automatically dial a series of emergency phone numbers and give a recorded message," he said.

Using one of the computer's programs, Mrs. Prugh can type a rough draft of the letter, perform a line-by-line edit without having to retype the entire letter, and then have the computer prepare a final, error-free copy.

His daughter worked out a program with her father that converted electronic signals into organ sounds.

Data Bank 'Crosses' State Lines

CW Midwest Bureau

CHICAGO – A network of 47 data centers nationally maintains records of the tissue and protein requirements of over 600 persons needing organ transplants.

The system was implemented recently through a Los Angeles data bank with a New Orleans donor to save the life of a Chicago housewife.

In this instance, a New Orleans man was dying of an incurable brain disease. The man donated his kidneys. The New Orleans hospital fed input on tissue, history, and protein levels to a data center which in turn matched the input with data requirements of possible recipients.

The match was made in a Los Angeles data bank, and the New Orleans hospital rushed the organs to a Chicago hospital where surgery on a young suburban housewife saved her from certain death due to kidney malfunction.

Dr. Paul Terasaki, of the University of California at Los Angeles Medical School, department of surgery, said that the Los Angeles data bank involved in this case uses an IBM 360/95 programmed for tissue matches, with emphasis on white cell group types.

When not running match programs, the system is employed in the research of more sophisticated tests for the discovery of white cell group types analysis.

Terasaki also said the computers are used to solve the complex logistic problems arising out of transporting organs from donor to recipient.

The doctor pointed out that the centers are also used for the training of personnel in the techniques of tissue typing.

And Now a Message From Your CRT...

CHICAGO – Viewing data on a CRT may become more and more like watching TV as advertisements get interspaced with technical subject data if the predictions of Gilbert W. Chapman Jr., publisher of trade magazines at McGraw-Hill, come true.

According to Chapman, data banks linked to computer typesetting for magazines would be fed technical information. Advertisers, he said, would be sold space in the bank with their ads keyed to the subject matter.

Speaking to the members of the trial Chicago Chapter of the Association of Industrial Advertisers, Chapman spoke of a system that would provide reference material to a journal's readers.

The New York Times and
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the most elusive components in computers and data processing...

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This unique reference is particularly useful not only for personnel managers, employers and recruiting organizations but also for libraries, conference planners, directors of computer installations ... anyone who needs to keep up with the people who count in the field.

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Camden Charts Patterns Of Crime With Computer

CAMDEN, N.J. – A computer normally used for research in advanced space and military systems is being used to help fight crime here.

A Spectra 70 computer at the RCA Advanced Technology Laboratories analyzes five categories of crimes committed in the city over the past year – robbery, breaking and entering of homes, breaking and entering of non-residences, automobile thefts and theft of items from vehicles.

The evidence on each crime is being broken down according to location, time, day of week, item stolen and mode of operation. In addition, details on both the victim and perpetrator are being compiled and studied.

Information on the offenses also will continue to be programmed into the computer on both a weekly and monthly basis to chart crime patterns and forecast the times and areas in which violations are likely to occur.

"We believe these studies will make a significant contribution to our efforts to reduce crime in the city of Camden," Mayor Joseph M. Nardi Jr. said.

The data run off by the computer is displayed at the Crime Statistics Analysis Office at police headquarters.

Vietnam System Sets Record For Performance

CAM RANH BAY AB, Vietnam – The huge computer system at this seaport along Vietnam's central coast has just whirred, clicked and clacked its way to a significant record.

The Univac 1050-11 system, composed of a primary computer, a secondary computer and 14 remote teletypewriter sites around the base, recently performed at 100% capacity for 118 consecutive days, according to Sgt. Paul P. Gilbert in charge of computers with the 1964th Communications Group.

The computer is the largest Univac 1050 system in Southeast Asia and this has been its longest period of full capacity running since it was installed in 1966.

"The record was made possible by two things," said Sgt. Wayne R. Hawkins, team leader. "Long hours of hard work by Air Force computer repairmen, during which they accomplished an outstanding program of preventive maintenance, and the professionalism of the operators of the equipment."

The computer system monitors the supply and logistics complex for Cam Ranh Bay Air Base.

Rangefinder

The minicomputer in the Marconi Radar Systems, Ltd., Instrumented Visual Range System, at Gatwick Airport in London, accepts measurements from photoelectric equipment on the runway and uses it to calculate visual range, as well as assuring the correct calibrations, checking on the correct operation of the system, and controlling the logging and formatting of the acquired data.

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This is the tote room at Laurel Race Course, where a new computerized system of handling race track betting has just gone into operation for the first time.

Computers Are off to the Races

LAUREL RACE COURSE, Md. – The largest and fastest collector of cash in the nation except for the Internal Revenue Service – the parimutuel betting system – is now one step closer to being fully computerized.

New sophisticated, solid-state equipment, which can handle a greater volume of money and heavier feature betting than was previously possible, is in operation at the Laurel Race Course.

The equipment was designed and produced by General Instrument Corp. through its subsidiary, American Totalisator Co., Towson, Md.

In 1969, race track tote systems handled bets totalling more than $5 billion, according to Moses Shapiro, chairman of the board and chief executive officer of General Instrument.

More than $5 million has been bet in a single afternoon at the major tracks, he said, and the betting on one race has amounted to more than $2.5 million.

"Just imagine between 25,000 and 50,000 people putting up $1 million or $2 million in the 15 to 25 minutes between races, requiring tote capability of accepting 300 bets per second" Shapiro said.

"Imagine equipment which keeps the odds current and posts them as they change. And visualize equipment that publishes the price the moment the results become official. That will give you an idea of the data which our equipment must process, and do so in real time and with total reliability."

The new tote system here at Laurel consists of two computers, two high-speed printers, control console, betting interfaces, power inverter, batteries for use if there is a power failure, 342 ticket issuing machines, and indication equipment including the infield tote board. A closed circuit TV system enables the tote manager to check the infield tote board. The duplicate facilities protect the race track and the public against equipment failure.

Two general-purpose digital computers are used in the tote system. Their two core memories handle the storage of programs and the operation of the parimutuel system including the checking and verification of each operation, including every last bet. Each memory has a capacity of 20,490 words of 16 bits each.

The entire tote system utilizes 6,500 transistors, 15,000 diodes, and 4,500 integrated circuit chips on 575 printed circuits boards.

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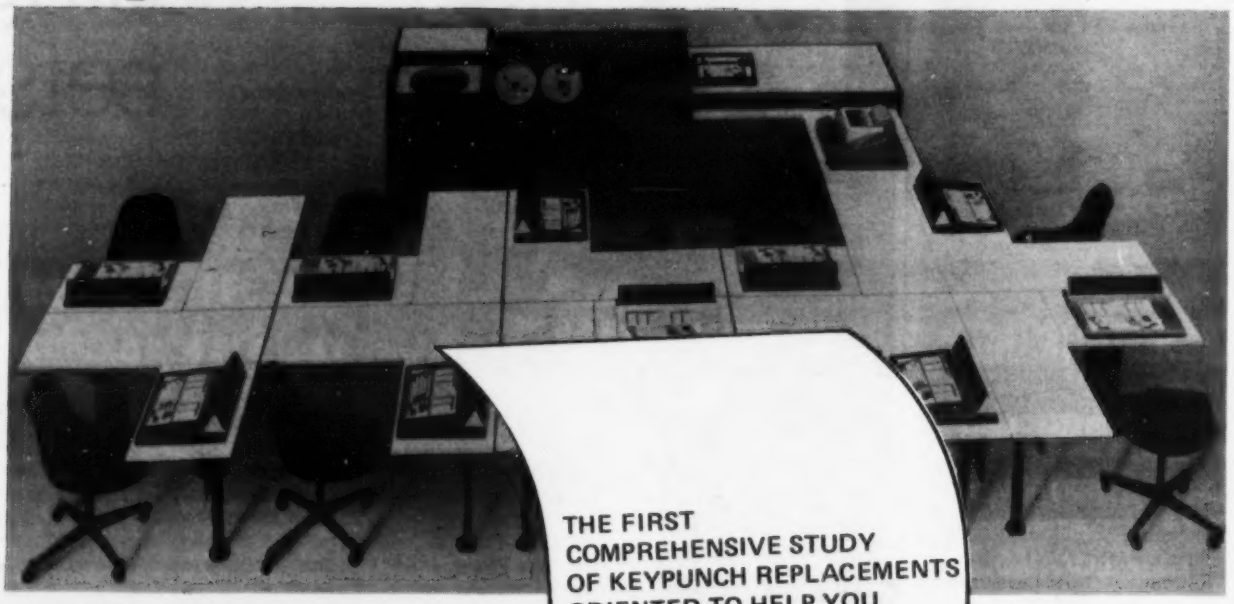

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Facilities Management - Part II

Users See Cost Reduction, Fewer Personnel Problems

By Malcolm L. Stiefel
Special to Computerworld

When the right user and the right facilities management company get together, both can profit substantially. The benefits that can be realized were summarized by one user who had recently signed a long-term facilities management contract.

"Look," he said, "I know to the penny how much my own data processing department has cost over the last three years. These facilities management people promise to work for 20% less than that over the next five years. If they perform, I can pour the 20% back into new applications, so I'll be doing more work for the same money."

Facilities management has been described as data processing services combined with management consulting. But a universal definition does not exist.

In this series, CW examines this growing field in some detail, describing how facilities management works and its impact on the user.

And if they don't perform? Suppose they go out of business? He shrugged. "What have I lost? I still have the computer programs I had before they came. I still have the computer, because I haven't turned it over to them. True, they've taken all of my data processing personnel, so I'll have to hire and train new people, but that's about all."

We only began this arrangement a short time ago, and I'm ahead already. Personnel was my biggest headache is data processing. The keypunch department was like a revolving door. Now it's their problem."

This combination of cost reduction and real or apparent elimination of personnel problems was cited by every user willing to discuss his relationship with a facility management company.

What Are the Users Afraid of?

Strangely enough, very few users were willing to talk, beyond acknowledging the existence of a facilities management contract. What were they afraid of?

Perhaps, they felt that the presence of a facility manager reflected on their professional ability to manage their own affairs. To many people who aren't in the business, data processing is the simplest of tasks, and anyone who can't carry it out as efficiently as his neighbor is unworthy.

Some users feel that the arrival of a facilities management company signals a sure loss of control over their data, and therefore over their business.

Facilities management firms agree that this is the toughest point to overcome in selling. One said "I tell them that they'll gain control over their budget by using us. If they can't see it, I don't try to convince them otherwise."

Even for established, well known companies like Electronic Data Systems, this users' fear of loss of control over data is a major obstacle. A spokesman said that EDS salesmen offer the valid argument that monkeying around with a client's data, violating a client's confidences, is entirely against EDS' own interest, since the firm's business relies heavily upon references supplied by past customers.

Even so, the users are hard to convince. They hear stories about companies suffering losses of business as a direct result of apparent mismanagement by a facilities management company.

Interestingly enough, in conducting this study, the writer found instances of users losing money because of their facilities management company, or because of their own failure to deal properly with the facility manager. But in no instance was misuse of data found to be a problem.

It would seem that the reluctant prospects are dissipating their energies worrying about the wrong thing. Loss of control over data isn't the problem. Improper management of the facility manager should be avoided.

If the user doesn't keep a sharp eye on the performance of the facility manager or if the contract doesn't give the user the proper protection, then a degraded operation could result. If the user isn't vigilant, the facility manager loses some of his incentive to keep schedules, to maintain good data quality, and to improve the operation.

If the contract is not sufficiently explicit (or amended by appropriate specifications) to delineate clearly what the facility manager must do, then any output is subject to question, any error is cause for complaint. Minor differences between the user and facility manager can lead to open warfare, without a well-written contract.

The user must be strong enough to make technical and administrative decisions when the facility manager needs them. Sometimes the user must be willing to alter his manual procedures, at the request of the facility manager in order to get better data or better turnaround time.

The user must be flexible, the facility manager must be competent, and the contract must be explicit. If some of these ingredients are missing, things just won't turn out right.

Malcolm L. Stiefel is an independent consultant with extensive experience in systems analysis, design and evaluation. He is currently engaged in studies dealing with inventory control systems and municipal information systems.

ALU Bypasses Data Exceptions, Lists Files as Used During DOS/360 Testing

By Don Leavitt
CW Staff Writer

KING OF PRUSSIA, Pa. – Programmers working in a DOS/360 environment can have faster, more effective test sessions and get their programs debugged sooner by using the Advanced Logical Utility (ALU) package from International Systems Inc.

ALU is a test monitor that resides in core along with DOS and the program being tested. In use, it provides a list of logical test records, both input and output, printed in event sequence and interspersed with the user's print lines.

In addition, the package automatically intercepts data exceptions before they cancel the program test. Following the DOS message identifying a data exception program check, ALU prints the problem data field, then zeroes it and continues the test.

The test monitor supports Cobol, Assembler and RPG programs, and requires no modification to source coding. The company said that ALU handles sequential and indexed sequential files on card, tape and direct access devices. It can work with fixed or variable length records, either blocked or unblocked, according to International. The consolidated printout of files, print lines and data exception error handling not only eliminates the need for utility prints of the files after the test session, but documents the interrelationships of records from different files.

The user can select which files are to be printed by ALU. As program testing progresses and routines are checked out, the records for the files using those routines can be dropped from the list, according to International.

ALU provides selective printout of portions of records. With this feature, data fields that are not pertinent to the test need not be printed.

Each record is identified by file "sys" number, and record number within the file. An indication of whether the file is input or output, and the length of each record is also provided.

The printouts can be in hexadecimal, or character notation, or both, the company said. At the end of each test, ALU prints a count of data exceptions handled, by location.

ALU is implemented by a minor change in the JCL stream of the program being tested. The package requires 3K bytes of main storage, and costs $1750.

International Systems Inc. is at 570 DeKalb Pike.

L2000, TC-500 Package Aids In-Patient Accounting

GREENVILLE, S.C. – Hospitals having either a Burroughs L2000 billing computer or the related Burroughs TC-500 terminal computer can do in-patient accounting with a software package developed by Systems & Programming Services (SPS).

Users of another SPS package can do payroll accounting on the Burroughs equipment, with the ability to calculate taxes for four jurisdictions for each employee, if applicable.

A third package allows CPAs to perform client accounting, including general ledger, detailed ledger and profit and loss, on the L2000 or TC500.

The hospital in-patient accounting has been developed in two versions. SPS said that it can process the work on a ledger card basis, or through journal entries.

The payroll package is said to handle the entire processing cycle from gross and net pay calculations and check writing through preparation of the quarterly 941 report for the IRS and the annual W2 form for the individual employees.

SPS noted that its packages are coded in the standard assembler provided by Burroughs. The firmware sections of the equipment are not directly involved, the company said, so that the packages would remain effective even if the manufacturer alters the firmware capabilities.

The hospital package sells for $3000 and the payroll system for $2500. The Client Accounting package for the L2000, model 608, with 512 words of memory, sells for $2125, and the version for the larger model 908, with 768 words, sells for $3125. The optional payroll reporting section adds $500 to the cost.

The packages are available from URS Systems, San Mateo, California, on the west coast, from Computer Services Inc., Paducah, Ky., as well as from SPS.

Systems and Programming Services is in the Daniel Bldg on Main St., here.

Communications Networks Designed With T/S Program from Computeria

BRAINTREE, Mass. – Communications system designers can determine the interconnect links, mileages and charges that would apply with various possible terminal sites, by using the Tolls time-sharing program that is being made available on several networks by Computeria Inc.,

To use Tolls, the designer describes the central data concentrator and its remote sites and inserts the desired optional parameters. Computeria said that designers need no programming knowledge to use Tolls.

In addition to the central and remote site locations defined in terms of V and H coordinates, the user provides busy hour traffic as one of the site file elements. The variable parameters include number of bits per character and the type of common carrier to be utilized. Line speed in bit/sec, and a line utilization factor can also be considered by Tolls.

Once data is entered, the program prints out an optimum arrangement with respective mileages and charges, and a summary of the charges. The program determines the interconnect links appropriate for the remote site locations.

The designer is able to apply different variable parameters to the basic site file, to generate alternate mileage and charge patterns for consideration.

Computeria said that Tolls will accommodate 60/75 baud, 100 baud, 150 baud and voice grade codes in both half and full duplex mode.

Names of the time-sharing networks on which Tolls has been implemented are available from Computeria at 14 Wood Road,

Leasco Adds Batch I/O to T/S Net

BETHESDA, Md. – Remote computing subscribers can process their occasional batch jobs under the Leasco Response/360 system by using a high-speed card reader, card punch and printer at the Leasco processing center.

To use the card reader, the subscriber mails his card file to Leasco and notifies the company's operator when he wants to read the file. In the same way, to use the card punch or printer, the subscriber has to advise Leasco ahead ot time.

Any special cards or printer forms needed for the output have to be supplied by the user, as must any unusual printer carriage tape.

The output would be mailed or otherwise sent to the subscriber as soon as it has been prepared, a Leasco spokesman said.

Leasco Response has headquarters at 4833 Rugby Ave., here.

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'Simscript II Plus' Adapted to DOS/360

By Don Leavitt
CW Staff Writer

WHITE PLAINS, N.Y. – The capabilities of the Simscript II Plus simulation language are available under DOS/360 and under a time-sharing service, according to the developer, Simulation Associates Inc. (SAI).

Previously available for use under OS/360, Simscript II Plus is designed for industrial engineers, corporate planners and others who have an understanding of systems in their own field but no special EDP knowledge.

With Simscript II Plus, users are able to construct mathematical models and determine the effect of proposed changes in the systems before the changes are actually undertaken.

Object programs generated by the II Plus/OS compiler will execute under the II Plus/DOS run-time monitor, SAI said. This means that simulation models can be designed and debugged on OS/360 systems or through SAI's interactive time-sharing implementation on National CSS, and then run on systems as small as a 64K Model 30.

The Simscript II Plus/DOS run-time monitor is available now and leases for $100/mo. The company expects the Simscript II Plus/DOS compiler to be ready for delivery in the first quarter of 1971. It will lease for $6,000 for the first contract year.

National CSS said that the time-sharing implementation of Simscript II Plus is available at the network's standard charges.

SAI noted that its prices include installation, full compiler and/or run-time monitor maintenance and assured compatibility with OS/360, OS/370 and DOS/360. Quarterly language updates and compiler performance improvements are also included, as is membership in the Simscript II Plus Users Group.

Simulation Associates Inc. is at 600 North Broadway.

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IDC is the leading market data gathering, research, and consulting firm in the computer industry.

'I/Trac' Gives Engineer Nonlinear DC Analysis

WHITE PLAINS, N.Y. – Design engineers can perform nonlinear DC and transient analysis in an in-house time-sharing environment, with the Interactive Transient Analysis by Computer (I/Trac) system developed by Berne Electronics.

I/Trac provides a conversational language with which the engineer describes the circuit topology and part parameters. After entering the circuit, the user may specify up to 10 separate time regions for the transient analysis.

During transient circuit simulation, the delta time is automatically adjusted by the program to reflect the difficulty of solution converge.

Output from I/Trac is a tabular solution, or a graph of any unknown plotted against time.

I/Trac contains nonlinear models for the diode and transistor, as well as standard models for resistors.

Program execution time is faster than many nonlinear "batch" programs available, Berne claimed.

The I/Trac system is available immediately for users with in-house PDP-10 or 360/67 systems, and is priced at $5,000.

Berne Electronics, Inc. is at 28 Havilands Lane.

'Tape-Job' Helps Speed OS Work

WESTPORT, Conn. – Users operating under OS/360 are able to test their implementations of IBM-supplied software, with the Tape-Job package from Hygain Technologies.

According to Hygain, Tape-Job is basically a magnetic-tape oriented librarian system.

Hygain said that the Tape-Job package permits the listing of all programs on the tape by job name.

Tape-job is written in BAL and will operate on any 360 using OS. Core requirements are 4K bytes. The Tape-Job deck, complete with documentation, is available from Hygain for a single charge of $185.

Hygain Technologies is at 65 Whitney St.

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Model / Features	IBM System/7	Raytheon 706	Varian 520/i	GE GE-PAC 30-1	DEC PDP-11/20
Memory Size (K bits)	2 to 16	4 to 32	4 to 32	524	4 to 28
Word Length (bits)	16	16	8	32	16
Cycle Time (μsec)	0.4	0.9	1.5	1.5	1.2
Interrupt Capability (no. of levels)	4; (16 sub-levels)	16	11	—	4 plus sub-levels
Peripherals	none announced	paper tape; card reader/ punch; printer; mag tape; disk; plotter; A-D I/O; communications	Teletype, paper tape; printer; data communication system	Teletype; paper tape; card reader; drum memory; printer; plotter; CRT	printer; mag tape; disk; communications
Price (basic system) ($)	operator station, 2,240 (purchase only); computer, 2,000; one I/O module, 16,060;	19,000	7,400	11,075	10,800

Chart compares characteristics of new IBM System/7 with other process-control computers.

System /7 Best for Current IBM Users

By the CW Technical Staff

System/7, IBM's new entry in the process control field, will probably attract only those users who already own a larger IBM system.

System/7 is generally more expensive than other equipment, while not presently supported by a broad range of peripherals and software.

With 4K words of memory and the required control station, the system costs $21,975. By contrast, for less than $1,000 more, a user can buy a DEC PDP-11/20 with 4K, and a tape drive. In neither case are A-D converters included.

The lack of software and peripherals isn't likely to exist for long, based on IBM's past record. In addition to the assembler, a high-order language compiler, utility packages, and debugging aids, will probably be forthcoming.

An IBM spokesman told CW that an application program library, called AML/7, is already being developed, and will be available.

An expanded line of peripherals for communication and data storage is probably on the horizon as well, to make the machine more useful to non-IBM users.

But right now, System/7 is seen as an extension to the capability of the 1130 as a front-end data gathering device, especially for audio frequency analog signal sampling. Since the peak sampling rate of the announced A-D converter is 20,000 samples per second, the highest frequency that can be examined without loss of information is 10 kHz, which is slow in comparison to other systems.

By contrast, DEC offers an A-D converter, the Model ADO1, which can take 66,000 samples per second and incorporates a sample and hold feature.

Of course, with its direct interface with the 1130 and the availability of communications with the 1800, 360 and 370, System/7 could be a boon to users who may not be able to buy compatible front-end systems readily from anyone else. But small 2K System/7 configurations will not be seen in many stand-alone applications for some time to come.

The assembler developed for use on the System/7 cannot be used on the 2K version of the system, IBM said. On the other hand, the company is stressing the fact that programs for the System/7 can be assembled on a variety of "host" computers.

This means, as far as the user is concerned, that he has to have either a 4K System/7, or one of the larger host machines, in order to develop his own programs for the System/7.

Videojet Printer Has Forms Control Option

SAN LEANDRO, Calif. – A low-cost intermediate data storage device from the Friden Division of the Singer Co. incorporates a communications controller for transmission of stored data.

The Friden Model 800 Individual Store and Forward Module is a self-contained magnetic tape peripheral. It provides intermediate storage of input from data terminals prior to Ascii data telephone transmission

The Friden Model 800 Individual Store and Forward Module is priced under $800. Installations have already begun for some Friden systems.

Key-Edit Data System Gains Three Features

WALTHAM, Mass. – Consolidated Computer has added several features that expand the performance of its Key-Edit data preparation system, at no increase in price.

The features provide master file updating, improved supervisory control and faster verification.

Consolidated Computer is at 235 Wymen St.

Tally Communications Terminal Records Data on Magnetic Tape

KENT, Wash. – A buffered computer compatible magnetic tape data communications terminal from the Tally Corp. has a built-in modem.

The T-1800 receives incoming data over standard voice grade telephone lines on computer compatible magnetic tape ready for immediate computer processing. Thus, the terminal can be used as an off-line high-speed batch receiver for multiple remote reporting stations, the company said.

The major feature of the T-1800 is the incorporation of advanced error control techniques, Tally said.

The T-1800 terminal is centered around a communications control unit. Error control, transmission electronics, modem, and line discipline logic are all contained in the control unit module. Transmission speeds of 1,800, 1,200, or 600 baud are available.

The T-1800 is priced at $700/mo, or $13,750 on a purchase basis. It is available on a 90-day delivery schedule.

Tally Corp. is at 8301 S. 180th St.

CAI Minis Get Printer Option

NEWPORT BEACH, Calif. – An interface for Data Products line printers is available as a peripheral option on Computer Automation, Inc. minicomputers, Models 116, 108, 208 and 808.

The interface is designed to control either Data Products Model 2310 or 2410 line printers.

The price of the interface alone is $750. The interface is currently available on a 30- to 60-day delivery schedule.

Sigma 7 Users Comment: New System Not Perfect

By Frank Piasta
CW Staff Writer

The recent announcement of the XDS Sigma 9 represents the first major product from that company in some time. Since the Sigma 9 is basically an enhancement of the company's Sigma 7, CW spoke to some users of the older system in order to obtain their reactions to the new machine.

Current users of XDS equipment seem basically satisfied and most of them are looking forward to the Sigma 9.

Lacks Paging

The new system does not, however, come up to some user's expectations. The most serious complaint cited for the Sigma 9 was the lack of an announced demand paging feature. Users felt that a base-relocatable addressing scheme that would enable a program to address all of memory, was needed on the 9.

One user described the 9 as a speeded-up generalized 7. The increase in speed was achieved, he felt, in the reconfiguration of the machine for multiprocessing.

The incorporation of instruction look-ahead, parallel operation, improved instruction architecture, and faster registers all contribute their share to the improved performance, he said.

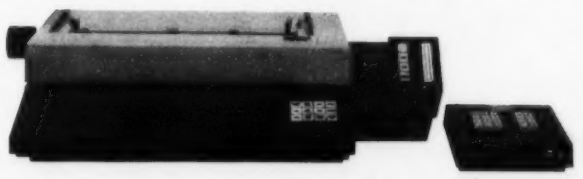
Multiple Processors Advance

The availability of multiple processors was said to be a significant advance over the 7. This, users felt, would enhance system reliability by furnishing back-up in case of processor failure. Simplification of software design was another claim made for the new multiprocessor configuration. The most beneficial advantage cited was the increased throughput capability.

The flexibility of the Sigma series, particularly in being able to adapt to other manufacturer's products for interface purposes was mentioned.

Other positive comments about the new system cited improvements in trapping logic and in the execution of instructions in an interrupt environment. Another comment praised the systems ability to handle remote terminals in an on-line environment, from the instruction execution level.

The absence of mass storage bothered some users, but it was pointed out that the system's addressing scheme allowed for the direct addressing of two-billion locations. This was taken as an indication that bulk core memory would be added in the future.



The Novar 10 key numeric input on the right can be added to Novar tape terminals by plugging it in. Greatly speeds up the terminal's capability to handle numeric data for computer processing. Does columnar tabbing too.

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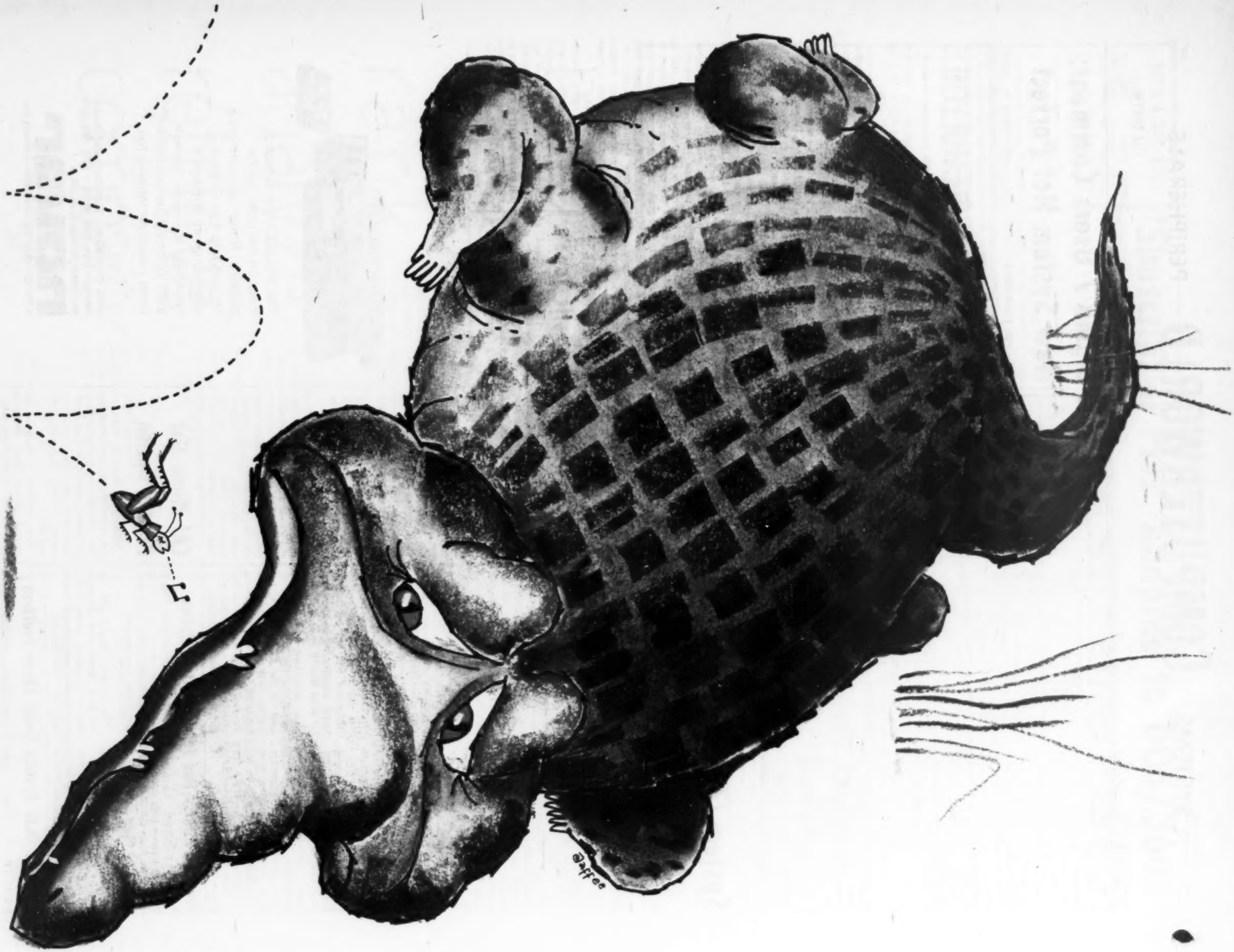
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Keypunch/verifier functions. Starting with the familiar 64-character keyboard, each Inforex keystation performs all keypunch and verifier functions: Automatic check-digit computation. Automatic left zeros. No digit by digit keying is necessary. Electronic skipping and duplicating rather than mechanical. Auxiliary duplication or two additional levels of program control. Automatic + or − signing of fields.

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Keyboard to tape functions. Inforex automatically pools input from up to eight keystations onto 7 or 9-track compatible tape. One easily entered statement transfers a series of batches. Only one keystation is required to initiate the transfer, and all keystations are functional during transfer. There are no cartridges to handle or identify, no special equipment needed for pooling.

Recallable programs. Each program has four levels of control. Once the program is keyed, it can be stored for future use and recalled by any operator merely by keying its appropriate program name. Up to 128 different program controls can be stored. There's no program card or tape mounting and no repetitive program control keying.

Self-balancing. Zero balancing is an integral part of the Inforex system. Each operator may accumulate a control total during data entry. Edit controls allow rapid correction. Adjustments to the balance total occur automatically during verification.

125-character records. With Inforex Intelligent Key Entry, the record length is variable up to 125 characters.

Full record display. For added accuracy, each keystation displays an entire 125-character record with moving cursor and position counter. The system has a forms capability that allows data entry and verification in a "fill-in-the-blank" fashion. Operator messages for direct interaction with the system along with search and paging of a file are standard.

Attractive office decor. Inforex design innovation doesn't stop with the components. Each Inforex keystation is built into an attractive contemporary walnut and black steel desk designed for operator ease and comfort. And remember, the system is electronic, not mechanical, allowing a quiet, comfortable atmosphere to work in.

Inforex monthly rental cost is $50 per keystation. $560 for control unit (up to 8 keystations). $960 for a complete 8 keystation system, including maintenance.

Inforex, Inc., 21 North Avenue, Burlington, Mass. 01803 or, Inforex AG, Dornacherstrasse 210, Basel, Switzerland.

"Inforex it."

Data-Kap Converts Data From Cassettes to 1/2in. Tape

HOUSTON – A free-standing, off-line unit from Electronic Laboratories can be used to convert data from cassettes to one-half inch tape. The Data-Kap 811 can also be used to poll the company's Model 810 reader/transmitter via data sets over telephone lines.

Data from cassettes can be handled in formats up to 22 char/record. It is blocked and recorded on computer-compatible tape at 120 char/sec. Standard inter-record gaps are used. Tape can be written in 9-track 800 bit/in. NRZI, with 7-track at 200 and 556 bit/in. available as an option.

Parity check on output data is incorporated in an optional read-after-write check. When an error is detected a flag is written on the output tape. Another option allows parity checks on input and ouput characters.

The 811 operates with Bell Dataphone modems via the dial-up telephone network, or other voice grade communications facilities. Input can also be from cassettes. The company at present offers equipment to use with the Phillips cassette, but a spokesman said that equipment to suit other cassettes and tape cartridges would be built to order.

The Data-Kap 811 is priced at $9,800. The unit is available on a 60-day delivery schedule.

Electronic Laboratories, Inc. is at 3726 Dacoma St.

Digital Plotter Usable Both On-and Off-Line

IRVINE, Calif. – Digital plotters from Valtec Corp. can be used either on-line to a computer or off-line with magnetic tape, rotating memories, or a card reader.

The Series 2000 Plotters feature logic that allows direct connection of the unit to the I/O buss of the data source, simplifying programming, the company said. Existing plotter software, can in most cases, be used.

The Valtec units operate from end-point data under closed-loop control. Feedback circuits are used to determine the position of the pen.

Two types of plotters comprise the series. The Model 2048 is a general-purpose plotter that can produce continuous line and point plots from digital data sources in three modes: end point, delta and incremental. The Model 2024 is an economy model that can produce point plots and straight line segments, up to one inch, from end-point data.

Standard interfaces are available for Micro Systems, DEC, Data General, and other computers.

Prices for the Series 2000 plotters range from $2,995 to $8,500. The Valtec Corp. is at 17751 Sky Park Circle.

TTY Rolls on

SANTA MONICA, Calif. – A cart attachment for Teletype terminals, from the TTS division of Remote Data Terminals allows the unit to be moved easily.

The single unit price of the cart is $39. It is currently available from stock.

The TTS division of Remote Data Terminals is at 2928 Nebraska Ave.

Ribbon Prices Revised

GLEN COVE, N.Y. – A revised computer printer ribbon retail price list is available from Columbia Ribbon & Carbon Manufacturing Co.

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The Sierra 1914B is the field instrument with laboratory features — the ideal test set for complete, fast, on-site testing of data transmission systems. Designed for use in installation and maintenance testing by telephone company craftsmen, modem manufacturers, modem users, time-sharing computer companies; and many other data users.

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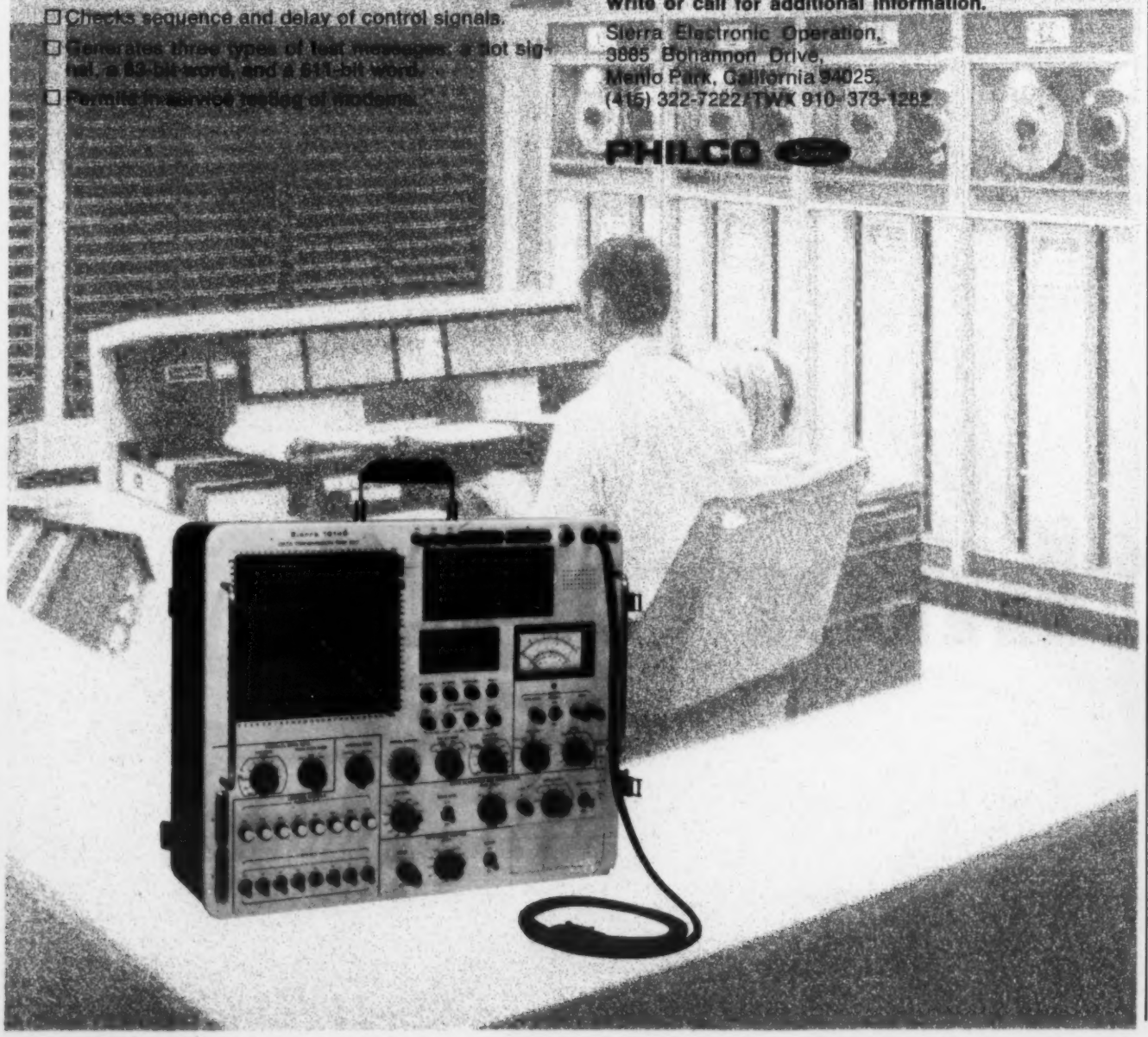

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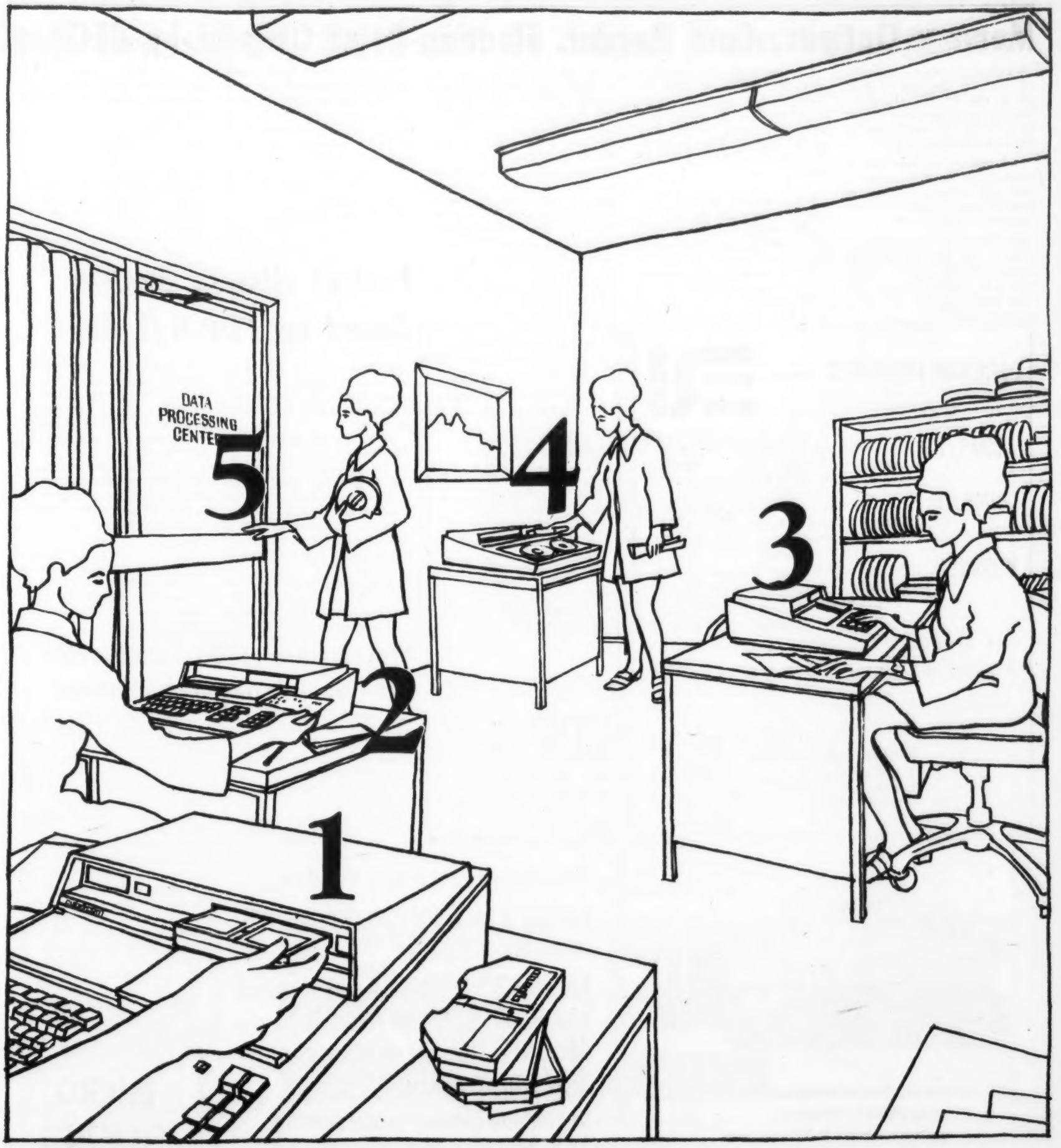

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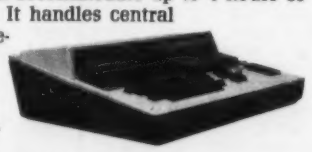

2. THE PROGRAM CARD. Also loads quickly and easily into the MARK I KEY ENCODER. It automatically controls upper and lower case shifting, starting and ending of fields, skip, duplication and left-zero operations in a parallel program format. Check-digit entry is by program. After the program is read into memory by an optical reader, the card is positioned above the keyboard to show the operator the exact column and position of each entry. Cybercom makes data entry easy for humans!

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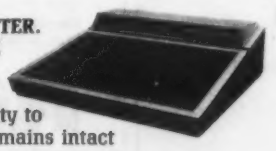

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Memory Options, Card Reader, Floating-Point Offered by DEC

MAYNARD, Mass. – A series of memory options, a card reader for the PDP-11, and a floating point processor for the PDP-12 have been announced by Digital Equipment Corp.

The memory options include three faster core memories, a read-only memory; and an interleave option for a PDP-11 with a minimum of 8K memory.

The new 16-bit core memories come in 1K, 2K, and 4K word blocks. All have a cycle time of 950 nsec, making them over 200 nsec faster than the core memory now offered.

Base price of the computer with 4K words of core and Teletype will remain the same: $10,800. The 2K word core memory reduces the base price of the PDP-11/20 by $600; the 1K word block, by $1,000, DEC said.

The read-only memory is a diode memory and also uses the 16-bit word. It contains eight groups of 32-word addresses and has a cycle time of 100 nsec. It can be purchased preprogrammed as a software loader or unprogrammed, as the user desires. Both versions sell for $300.

The interleave option reduces the cycle time wasted by overlapping read and write. In normal operation, data read from memory must be restored or rewritten or it could be read from memory only once.

In interleaving, 8K words of core are split into two 4K word segments and overlapped. While one segment is in its read or clear cycle, data may be written or restored in the second, reducing memory cycle time to as low as 490 nsec for a direct memory access transfer. The interleaving option will be available at no extra cost.

The CR11/CM11 card reader can read EIA standard data cards in either the punched or mark sense format. Information may be read in a 120-bit format or in an 8-bit format for condensed packing in memory.

Price of the card reader is $4,500. It is available for immediate delivery.

The floating point processor is said to give the PDP-12 computer a dual processor capability, and does calculations 39 times faster than before, while maintaining seven-digit accuracy, DEC said.

The FPP-12 is designed for all types of floating point arithmetic. The computational speed of the PDP-12 is dramatically increased because the floating point calculations are done by hardware rather than by software.

The price of the unit is $7,500.

Patient History System Based on PDP-8/E Mini

BOSTON – An automated patient history system from Computer Systems for Medicine Inc. is designed to save time for the physician.

Based on a DEC PDP-8/E, the Doctorsaid system is intended for the low-cost acquisition of complete patient medical histories in hospital of multiphasic screening environments.

The system has a repertoire of more than 1,500 questions and can be adapted to the needs of patients.

The system is available in desk top and console type models that can accommodate from one to ten patients simultaneously.

The patients are presented questions and alternative answers on a rear projection screen. A printed copy of the patients history, identifying positive information, is available immediately.

The Doctorsaid system has undergone field trials at the Peter Bent Brigham Hospital and is now in use at the Children's Hospital Medical Center, both in Boston.

The cost of a four-terminal system is $52,000, including the terminal and printer.

Computer Systems for Medicine, Inc. is at 340 Longwood Ave.

Statossystem 1300 Can Provide Off-Line Printing and Plotting

PALO ALTO, Calif. – For quick-look or recall of data, the Statossystem 1300 from the Graphics and Data Systems Division of Varian Associates, provides off-line digital printer/plotter capability.

The Statossytem 1300 includes a magnetic tape transport interfaced directly into a Varian Statos Electrostatic Digital Printer/Plotter.

A hardware character generator option allows the system to perform off-line listing or line printing.

GPR-5, a utility plot software package for the user's computer that permits the generation of plot tapes using Fortran compatible statements, is available.

The price of the system depends on the printer used. With the Statos 21 printer that accommodates 8-1/2 in. paper, the cost is about $12,000. With the Statos 5, using 5-1/2 in. paper, the approximate price is $16,500.

Varian, Graphics and Data Systems Division is at 611 Hanses Way.

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Bell Gives 50% Rate Cut to Some Data Set Users

By the CW Technical Staff

NEW YORK – Some users of AT&T's 103A data set can cut their monthly rental costs by more than 50% by asking Bell to modify the capabilities of their units.

Modification of the 103A from an originate and answer unit to an originate-only data set is being offered to data users with a cut in charges by some of the Bell System operating companies.

Although the move seems prompted only by delivery delays for Bell's new 113A originate-only data set, the modification can reduce a data user's monthly rates from about $25 to $10/mo.

Communications

A spokesman for one Bell operating company told CW that several hundred letters had been sent to 103A data set users informing them of the reduced monthly charge in return for disabling the data set's answer capability. He added that thus far few users had indicated a preference for the reduced capability.

In some cases users are apparently being charged the lower originate-only rate without having their 103A modified. A data representative for one Bell company said his customers were being charged the new rate on request.

When asked whether there was any way to keep the customer from continuing to use the 103's answer capability, he said the phone company had no plans to monitor how the customer used the equipment. He added that the lower rate was viewed as strictly an interim arrangement until the local Bell company was able to supply the new 113A data set.

Although the cost and service reduction apparently is based on user demand, a Bell company spokesman told CW that the response to the 113A has "been less than phenomenal."

One spokesman for a western Bell company said that although his company did offer reduced rates to 103A users, it also had "plenty" of 113As available.

Some industry observers are puzzled by Bell's recent moves concerning the relatively low-speed (300 bit/sec) 103s and 113s, since AT&T has said that it would refrain from actively offering this type of data set after Western Union assumes control of the Bell TWX network early next year.

Although data users are pleased with the rate cuts, at least two manufacturers feel the AT&T rate reductions offer unfair competition for firms manufacturing similar devices.

One firm, General Datacomm Industries (GDI) has notified the various state regulatory agencies and the FCC asking for a full investigation of Bell's 113A tariff filings.

GDI claims that the modification of 103 rates was brought about because Bell "had not properly anticipated data customers' requirements and had designed and manufactured [the 103] with features exceeding data customers' needs."

The letter said that the 113A tariff, if approved, will enable Bell "to unfairly compete . . . to the detriment of the data communications industry and its users."

Even with the limited 113A data set, GDI said, the $10/mo rate does not cover Bell's costs, and the deficit would have to be made up through subsidization, probably levied on telephone subscribers.

The Connecticut Public Utilities Commission has replied to the GDI letter and said that it is withholding approval of the 113A rate filing pending an investigation.

The New York Public Service Commission did not withhold approval of the originate-only tariff but, in view of the GDI protest, a spokesman said discussions are continuing with New York Bell to find a "better way" of providing the service rather than modifying the 103A units.

Several other state regulatory agencies indicated that they would review or take under advisement the GDI protest.

A spokesman for Data Access Systems told CW that it has sent a letter to the FCC asking for an examination of the 113A tariff and the modifications being offered to 103A users.

Commenting on the 113A tariff protests, an AT&T spokesman said the actions taken by the Bell System companies have been "proper and in the best interests of the consuming public."

Datran Seeks FCC OK To Begin Network

WASHINGTON, D.C. – Dstran has asked the Federal Communications Commission for special authority to start construction of its proposed data network, and has challenged AT&T to support the request in the public interest. Datran has proposed a nationwide data communications network based on microwave transmission that would not use telephone lines.

Citing recent AT&T statements that the carrier would accept competition if the same ground rules apply to all parties, Datran said that this would occur if the FCC granted the authority for construction of the network while the issue of regulation for the specialized carriers is being discussed.

In its FCC filing, Datran asserted that AT&T, while claiming to support competition, "has opposed in every instance the establishment of the Datran system." The company also accused AT&T of "continuing to use the regulatory responsibilities and adjudicatory process of the Commission for the sole purpose of preserving (the telephone company's) competitively advantageous position."

AT&T has said that it will have a digital data network operating for data users by the mid 70s.

An FCC official said it is unlikely the Datran request would be okayed. He said such special authority is not generally granted for a system the size of the proposed Datran network "unless there is some sort of public emergency." Datran has not shown this to be the case, he concluded.

Johnson Rejects AT&T Bid

WASHINGTON, D.C. – Federal Communications Commissioner Nicholas Johnson has rejected a petition made by AT&T in which the carrier asked Johnson to disqualify himself from all further matters related to the Bell system. AT&T

AT&T had charged that Johnson had a bias and a deep-seated prejudice against the carrier.

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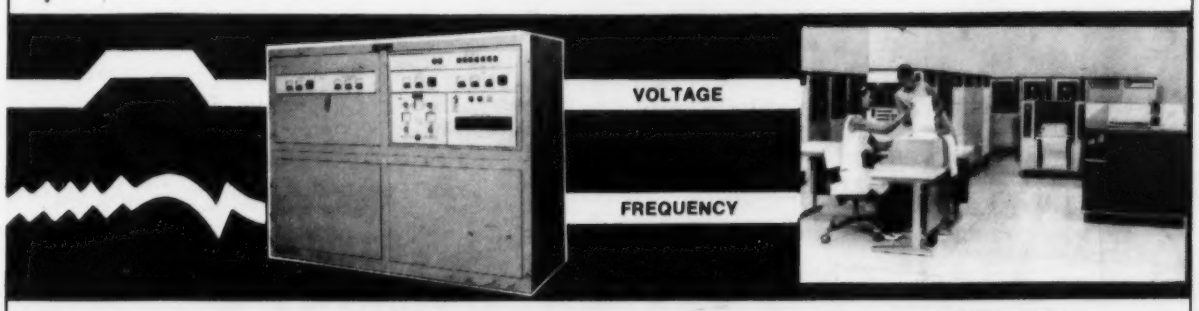

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ACM '71 Call for Papers Will Continue '70 Dialog

NEW YORK – The dialog initiated at ACM '70 between the people being affected by computer technology and those responsible for the technology will be continued at ACM '71, the 1971 National Conference of the Association for Computing Machinery (ACM), according to Walter M. Carlson, ACM president.

His statement was echoed by Dr. Melvyn H. Schwartz, ACM '71 technical program chairman, as he issued a formal call for papers for the conference in Chicago, Aug. 3-5, 1971.

The theme of ACM '70 was "Computers Meeting the Challenge of Your Future" and the show was one of the first attempts on the part of the computer industry to make a conscious effort to reach the public.

Schwartz, of Northwestern University's Vogelback Computing Center, stressed that ACM '71 papers and presentations will emphasize solutions to problems of major interest to the computing world which were first formulated at last year's "Unconventional Convention" and other topics. Authors are challenged to describe theoretical and fundamental scientific and technical solutions to the constraints which slow down the design, installation and use of computer-based systems.

Schwartz pointed out that technical review of submitted papers and sponsorship of conference sessions will be provided by Special Interest Groups and Committees (SIGs/SICs) of the ACM. The SIGs/SICs represent the ACM's technical infrastructure.

Intentions to submit papers should be received by Dec. 7, 1970. Papers will be due on Feb. 15, 1971, and final drafts of papers should be in by June 1, 1971. Papers will be distributed to preregistrants to a maximum extent prior to the conference.

Canada Computer Census Available From Information Processing Society

WATERLOO, Ontario – Copies of the 1970 Census of Computers in Canada, compiled by the Canadian Information Processing Society, are available to the public.

The census is compiled by province, including the name of the user; the computer model; delivery date, whether rented, purchased, or leased; main memory size; number of random access drives; number of magnetic tapes; and "remarks." The latter category indicates display device, computer-to-computer transmission, plotter, or computer used as process controller.

An index includes a list of computers installed by industry and monthly rental. Another list compiles computers installed by province and manufacturer.

Copies may be purchased for $16.25 per copy, post free, from the Canadian Information Processing Society, P.O. Box 484, Waterloo, Ontario.

The society has been compiling such a census for seven years, but this year is the first time minicomputers are included.

Afips Has FJCC Proceedings

MONTVALE, N.J. – Proceedings for the 1970 Fall Joint Computer Conference in Houston are now available from the American Federation of Information Processing Societies (Afips).

The proceedings, Volume 37 of Afips Conference Proceedings, contains 70 papers covering 24 technical sessions held during the three-day conference.

The fully-indexed 658-page volume may be obtained for $26 from Afips Press, 210 Summit Avenue, Montvale, N.J. 07645. For prepaid orders from members of Afips constituent societies, stating their affiliation and membership number, the cost is $13.

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November 25, 1970

Control Data booth shows increased OEM emphasis by major mainframe makers.

During Fall Joint
FJCC Exhibitors Stress OEM

By E. Drake Lundell Jr.
Computer Industry Editor

HOUSTON – IBM has now made it official – the Joint Computer Conferences are slowly but surely becoming trade shows for the computer industry instead of computer users.

The industry giant gave its blessing to this trend (almost 40% of the people at the spring conference in Atlantic City were interested in OEM products alone) with its first display of OEM products in the 18-year history of the JCCs.

IBM wasn't the only mainframe manufacturer to take advantage of the OEM aspect of the conference here at the Astrohall last week.

In fact, all of the major mainframe manufacturers at the show – generally the largest exhibitors – devoted at least a portion of their displays to OEM wares, including Control Data, NCR, and Honeywell.

Some of the reasons for this increased OEM emphasis were fatuous – an IBM spokesman saying: "We need the exposure; some of the companies might not know about us."

And the serious answers seemed to indicate a trend in the present state of the computer industry. The OEM markets are holding up better than end/user sections in what is beginning to look like a permanent recession; and the joint conferences attract more people interested in OEM products than end user devices.

In relation to the second point, exhibitors point out that the second largest group after the 40% of guests interested in OEM products last spring were exhibitors themselves – often prime markets for OEM gear.

The OEM nature of the show was also evident at the booths themselves. While IBM was the only firm to roll out a large mainframe, a 360/155, many of the exhibitors demonstrated systems incorporating minicomputers made by other firms.

In addition to the systems shown at the companies' booths, other firms showed systems incorporating 16 Digital Equipment Corp. systems.

Four exhibits had Hewlett-Packard minis, two used Data General products, two incorporated Varian Data Machines computers, and one had a Honeywell system. Redcor systems and IBM 1130s were used in two other displays.

The major new products displayed at the Fall Joint were also clearly aimed at the OEMs (see Page 32), with the lead being taken by the memory manufacturers.

This was the first joint where the tremendous influx of semiconductor memories was clearly evident. The core and plated wire advocates were clearly there, but they were far outshadowed by the semi manufacturers, who have recently been blessed by IBM with the introduction of a 370/145 with monolithic main memory.

The component manufacturers were also out in force – led by paper tape reader makers – leading one exhibitor to say: "Computer system designers would probably be happier here than at many of the recent components shows."

With the low attendance generated by the show and around one third of the people there manning booths, it seems clear that this joint, at least, was clearly an OEM show.

Whether this trend will continue into next spring will only be seen after all of the firms have a chance to evaluate sales generated from this conference. By spring in Atlantic City many of the OEMs might decide to go back to the traditional design conferences with their display dollars, or they might stay – changing the whole concept of the "Joints."

Future Seen Bright In Computer Graphics

HOUSTON – The computer graphics industry is about to emerge from a two year plateau and chalk up record gains in the next five years, Carl Machover, vice-president of marketing for Information Displays Inc. told CW during the ACM-sponsored seminar in computer graphics.

The industry, he said, has been relatively stagnant in the area of interactive graphics displays for the past two years, but will record a 10 to 1 growth rate during the next five years.

The upturn, at least in this field, has already begun. "We have noticed a significant increase in orders both at Information Displays and in the industry in the past few months," he said.

Presently, Machover estimated, there are about 1,000 interactive graphic CRT systems installed in the country.

This compares with a graphics "universe" that includes about 100,000 line printers, 50,000 to 100,000 teletypewriters, 70,000 alphanumeric terminals, 10,000 graphic plotters, and 500 to 900 graphic COM units.

While defining the universe, Machover was careful to point out that there were many grey areas and that the field was in a very fluid state, making it hard to draw hard and fast definitions.

Most of the well-publicized action in the interactive graphics field in the past two years has come in the lower cost end of the scale, he indicated, even though some extremely high-priced units (such as the Evans and Sutherland terminal) have also become available.

This trend will continue and grow, he said, because it allows the medium and small size user to enter the marketplace without the tremendous costs involved with earlier systems – both in the hardware and software areas. Software is estimated to run around five times the cost of the hardware for effective implementation.

At the same time, the software costs are coming down, he said, for the smaller user because the manufacturers are introducing more and more applications programs that are based on their earlier experience with high-cost systems.

At present, the low-cost portion of the interactive computer graphics market is being divided between such manufacturers of storage displays as Computer Display Inc., Computech, and Textronics, and manufacturers of raster type systems such as Data Disk, with some competition coming from the lone maker of photochromic displays – Corning Glass Works.

The firms pioneering the growth of low-cost displays and applications will be the key to the greatest growth in the next five years, he indicated.

"After all, how many aerospace companies are there that can realize the savings that are possible with large expensive systems – and how many companies can afford to implement such systems?" Machover asked.

Control Data Sets Plan For Overseas Agreement

NEW YORK – Another international combine appears to be in the making to compete with IBM on the international front.

International Computers, Ltd. of Great Britain, Control Data Corp. of the U.S., and Compagnie Internationale pour L'Informatique of France have agreed to form a joint study company, International Data, to explore areas of cooperation.

The new firm will be "the vehicle to broaden and accelerate the technical cooperation which has existed between the companies over the past years.

"The purpose of the joint company is to identify and investigate new opportunities for cooperation in important ventures, and to recommend implementation in ways which will further improve the prosperity of the parent companies . . ." according to the official announcement of the formation.

Many firms, when asked for comment at FJCC, seemed initially unaware of the deal but later emphasized that no current operations would be affected.

As to the effect on ICL's emerging OEM business in the U.S., E.C.H. Organ, assistant managing director for development, said: "The prime objective of the new company will be to so coordinate the planning of products and services and the development and production of hardware and software that each company can independently market . . . ."

The official statement did not mention production of new products, however, and said that the company would "make recommendations concerning the compatibility of the parent companies' future products and services."

The announcement led immediately to speculation that the English and French companies would now drop any plans for joint development of large-scale systems, leaving the market to Control Data equipment.

Firm Shows Value of Foreign Markets During Recession Time

OCEANPORT, N.J. – A minicomputer maker here illustrates the value of a strong international marketing program during times when domestic markets are in the doldrums.

Interdata, which entered the international arena less than 18 months ago, will do over 15% of its business overseas this year, amounting to aroudn $1 million on projected revenues of $6 to $7 million.

Last year the firm reported revenues of $5.6 million, so the international marketplace, which accounted for little of 1969 revenues, will be a main contributor to the projected advance in total sales this year.

And that's just the beginning, according to Jim Bruno, executive vice-president, and sparkplug for the international marketing effort.

In 1971 the international markets should account for around 20% of the overall company revenues and that percentage should rise to about 25% by 1975, he told CW.

The 1970 sales figure will only reflect efforts in two overseas markets, the United Kingdom and Japan, he said, adding that Interdata had opened a third sales outlet about one month ago in Germany.

In 1971, the firm will be opening "one or two" new overseas offices, he said, noting that attention was being given to the Australian and Scandanavian markets at present.

The basic "game plan" used by Interdata in penetrating overseas markets was expressed by Bruno as "don't go if you can't support your effort."

"One of the hardest things we had to overcome in the UK was convincing the people that we were there to stay; that we were not in testing the water," he said.

"We had to go there in force, we had to show that we were willing to support the equipment with service engineers, applications support, and programming support. And we did that.

"That, incidentally, was a considerable investment on our part," Bruno added.

He also indicated that the marketing programs should be geared to the individual countries a firm plans to penetrate.

In Japan, Interdata uses a Japanese trading company as its representative, as is recommended by the U.S. Department of Commerce, and finds the relationship "effective."

It is so effective, in fact, that Interdata now claims to be the largest supplier of U.S. minicomputers in Japan.

The trading company is a "good outlet for us in a country where we didn't understand the language, had translation problems, and recognized a lack of understanding of the import restrictions. . . . This company can do all that for us," Bruno stated.

Race Heats Up

Ampex, Monolithic Plan Units

HOUSTON – Memory systems sparked the OEM interest at last week's Fall Joint computer conference. They covered the whole range of available memory options from laser systems to low-cost tape units for minis.

Ampex was a leader in the race for new markets with four product announcements from semiconductor systems to more tape units.

The semiconductor unit, dubbed the ASM series, features access speeds ranging from 250 nsec (ASM-30) to 1.9 μsec (ASM-10).

Ampex, which claims to be the major independent memory manufacturer to enter the semi sweepstakes, said that the middle of the line (ASM-20) is "suited for manufacturers who require the speed and economy of high-performance semiconductor mainframe memory to compete with systems such as the IBM 370/145."

The other introductions by Ampex include:

A four-transport tape memory that uses one set of shared data electronics to connect four Ampex TMZ tape drives, one of which offers phase encoding for 1,600 bit/in. recording, is said to be the first such system priced for use with minicomputers.

A medium-speed tape memory that is an improved version of its predecessor, the Ampex TM-7, is priced 30% below the TM-7. Price starts at $3,950.

A minicomputer tape memory that is priced at approximately $2,000 in quantity offers IBM-format recording and packing densities from 200 bit/in. to 800 bit/in.

Monolithic's Four Units

The semiconductor memory race – which was never evident before on the floor of a Joint conference, though often in the technical sessions – also received a boost from Monolithic Memories of Sunnyvale, Calif., with four new units.

The first is a semiconductor memory subsystem with non-destructive readout designed for main computer memories, buffer memories and scratch pads.

It comes in two different performance ranges. The high performance subsystems have an access time of 120 nsec and cycle time of 100 nsec. The medium performance subsystems have an access time and cycle time of 150 nsec.

In all, eight different organization and performance subsystems are available ranging in price from 9 cent/bit to 19 cent/bit in quantities of one to 99. Delivery is immediate.

Next comes a 1,024-bit, 256 words by 4-bits bipolar read only memory with an access time of 30 nsec and power dissipation of 0.35 mW/bit.

The MM5200 has full address decoding on the chip and is directly DTL/TTL compatible at prices in the $50 range.

The firm also showed a 256-bit bipolar, random access memory (RAM) and associated decoder driver designed for use in fast mainframe scratch pad, and buffer memories.

The 256-bit RAM, MM6505, organized as a 256 word by 1-bit, has a read cycle time of 120 nsec and system access time of 120 nsec, including the decoder driver. It has a power dissipation of only 2 mW/bit.

The decoder driver, MM6504, is a binary to three out of six decoder. Each driver is capable of driving up to 64 packages (16,000 bits).

The RAM costs $50 and the driver $4.

Finally there was a 64-bit random access memory, the MM5500, organized as a 16 by 4 bit memory, and is designed for high-speed scratch pad, accumulators and small buffer memories.

It has an access time of 40 nsec and a power dissipation of 6 mW/bit and comes fully decoded in a 16 pin ceramic dual inline package.

Open collector outputs allow expansion to larger storage capacity, the company said. Inputs are standard 1.6 mA load and output sink 15 mA allowing DTL/TTL compatibility. Prices range from around $25 to $30.

Lockheed Cores

Meanwhile the magnetics side of the memory fence was also grabbing some of the spotlight, with three new core systems from Lockheed, even though it could not get production going on its plated wire system in time for the show.

In addition, Signal Galaxies was able to give the first public showing of its new "flux ring" magnetic memory concept.

The Lockheed systems include:

- A small-to-medium capacity memory system with a half μsec cycle speed, the CC-50, uses 14-mil cores and 3-wire 3D organization. It is available in modules that provide memory capacities from 4,096 to 65,536 words and word sizes from 8 bits to 72 bits.
- A 900 nsec core memory stack using 3-wire 3D organization is available in capacities of 4K, 8K or 16K words in any word size from 4 bits to 32 bits.
- A 16K to 65K 500 nsec cycle time memory system, featuring 3-wire 2-1/2D organization, the CEX-50 memory system offers 2-1/2D organization.

FJCC Sights

Increased OEM emphasis at the FJCC shown at Data Products booth. Light first day crowds are also evident.

Varian exhibitor gets down to the nitty-gritty of the 620/i for technically oriented audience.

Clare-Pendar was one of the many keyboard manufacturers displaying OEM wares at the show in the Astrohall.

International Computers was the leader of the foreign invasion at this year's joint, followed closely be several Japanese firms.

Merger Mania Stirred Up at FJCC By CDC Plans; 2 Set Agreements

HOUSTON – The announcement of a cooperative agreement between ICL, CDC, and CII (see page 29) just before last week's Fall Joint Computer Conference here seemed to set off a merger fever with two agreements announced and more than the usual quota of rumors.

And no one was denying that the economy was having an effect on the rush to wed syndrome.

Bendix, which sold its unsuccessful commercial computer business to Control Data a few years back, got back into the end-user marketplace with the acquisition of Logitron Inc. for an undisclosed amount of cash.

C.B. Sung, vice-president and group executive for advanced technology group at Bendix, indicated that the portable CRT terminal maker would have a volume of at least $5 million in the next few years as a Bendix subsidiary.

At the same time he also promised that Bendix would be transferring much of the technology gained under government contracts in the aerospace computer business into commercial developments over the next several years – beginning with an announcement this January.

Presently, about 20% of Bendix business is related to computers, but by applying technology learned elsewhere to the commercial side it should increase substantially. Bendix indicated at the same time, however, that it would not be reentering the mainframe market – but would not deny the possibility.

"I think we missed our chance in the '50s," one glum executive said.

The other announced merger involved Digitronics, which scooped up Dataterm, Inc., of Levittown, Pa., for undisclosed cash and stock.

Acquisition of the manufacturer of asynchronous paper tape readers now gives Digitronics this added capability to complement its synchronous paper tape reader line.

Digitronics predicted a $20 million paper tape reader market in five years – jumping from the present $16 million, of which it claims a 20% share.

The firm also indicated that more mergers were definitely on the way and said that several were in the "advanced discussion" stage.

Some Even Work at FJCC

HOUSTON – Anyone who has ever tried to get a computer system up and running has to marvel at the crews that set up displays for a Joint computer conference.

IBM can move in a 370/155 and have it up and running in just a few days; whole hosts of minis can be wheeled in, plugged in and be off and running in a few hours; and peripheral equipment is attached and off to the races in no time.

The exhibitor visitor only sees the results – neat, clean booths with perfectly operating equipment. But the men who do the setting up get a different picture.

The first photo shows Martin S. Albert of PerData literally up to his neck in a D-600 magnetic tape driver while James Christophersen prepares to test the unit.

Francis Brenner (above right) demonstrates the versatility of this breed – reading the specs while putting the finishing touches on Advanced Space Age Products Inc.'s high-speed paper tape punch. Emersed, if not buried in his work.

At least none of them had the problems of one exhibitor whose PDP-11 was "bent out of shape" by careless handling, however.

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Memories Highlight New OEM Products at FJCC

HOUSTON – Advanced Memory Systems' two new high-speed modular cards are organized in 4K-words by 1-bit and 512 by 8 and have typical access times of 15 nsec, the firm said. Power dissipation is 9 mW per bit, and the cards are ECL compatible.

The cards incorporate the AMS 0641 64-bit, 7 nsec memory cell, and AMS storage support circuitry.

Inputs to the cards are fully buffered, and unterminated emitter-follower outputs permit wired-OR operation.

Applications include scratchpad, buffer and cache memory in data processing equipment, test equipment, digital communications and telemetry.

Prices range from $4,900 for one to $3,360 in lots of 100. Delivery is four to six weeks.

The firm is at 1276 Hammerwood Ave., Sunnyvale, Calif.

Speeds of 3 Tape Drives Run From 75 to 200 IPS

HOUSTON – Three magnetic tape systems, models 20291, 20292, and 20293, by Bucode, Inc. are completely automatic loading and operate at speeds of from 75 to 120 in./sec, 120 to 150 in./sec, and 150 to 200 in./sec, respectively.

Available with read/write electronics for 800 bit/in. NRZI, 1,600 bit/in. phase-encoded, and dual (800/1,600 bit/in.) density recording, they offer transfer rates to 180 kHz, 240 kHz, and 320 kHz.

All models are available for delivery within 60 days. They are priced from about $9,000, depending on configuration and quantity.

Bucode is at 175 Engineers Road, Hauppauge, N.Y.

LSI Memory System Jumps To 32K in 4K Modules

HOUSTON – Datapac's new series of random access memory systems, called SemPac, is designed around a 1-in. square, multilayer thin film substrate module containing up to 4K bits plus all associated drive and decoder circuitry. The modules can be placed on 6 in. by 8 in. PC cards for systems capacities of up to 32K.

Applications for SemPac will be aimed primarily at mainframe CPU memory for large- and medium-scale computers, peripheral devices and controllers. Scratch pad and shift registers applications are also high on the list.

The system will be available in both bipolar and MOS configurations with speeds ranging from 80 nsec to 400 nsec cycle times. Logic level is TTL compatible.

Bit/word configuration is flexible and can be programmed into the system, Datapac said. The company, located in Santa Ana, Calif., will offer single system modules, card systems, and complete chassis assemblies with up to 250,000 bit capacities.

Pricing will range from 4 cent/bit to 15 cent/bit depending on system capacities, speed and design factors.

Sequential Application Areas Fit the Mostor 100

HOUSTON – The Mostor 100, introduced by the Systems Division of Electronic Arrays, Inc. (EAI), is a 1K by 8- or 9-bit memory designed specifically for sequential applications, and has an access time of 0.5 μsec.

Mostor 100 also can be used as a non-synchronous random access read-write memory in system applications where a relatively slow access time is acceptable, EAI said.

Packaged on a single PC board, the memory uses the EA1206, a 512-bit MOS shift register, as the basic storage element.

Both DTL and TTL compatible, the Mostor 100's interface signal timing format can be used with most systems, according to the firm. Alternate interface formats can be provided to match special system requirements.

In quantities of 100, the unit, available from the firm at 6109 DeSoto Ave., Woodland Hills, Calif., will sell for less than 2 cent/bit.

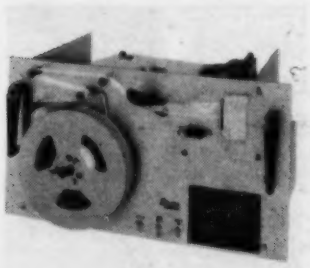
Analog Interface Line Expanded by Honeywell

HOUSTON – Honeywell Information Systems has added 17 compatible systems components in its analog interface module line.

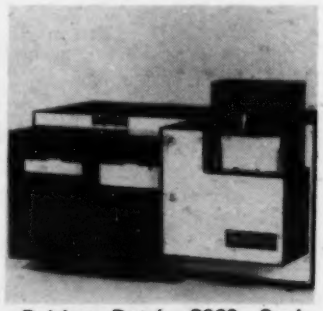
Three high-speed analog-to-digital converters, (ADC-708B, 710B and 713B); seven digital-to-analog converters (DA-720 Series); three amplifiers (BA-720, SH-720 and SH-725) and four high-level analog multiplexers (MX-720A Series) are available through the Systems Components Operation with normal 30-day deliveries.

The single-ended or differential multiplexers are eight and 16-channel filtered and unfiltered modules. They are used to connect analog voltages to the input section of A/D converters in either sequential or random selection through either a buffer or sample-and-hold amplifiers.

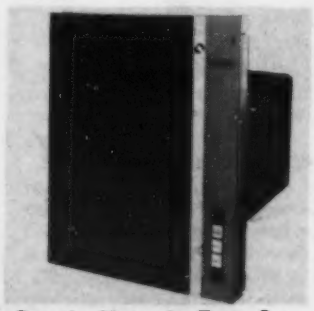
Single-ended modules are priced from $224; the differential types cost from $195.



Remex RPS-1075 Paper Tape Punch



Bridge Data's 8060 Card Reader



Bucode Magnetic Tape System Model 20291

Iomec's Iodisc 1001 Storage System

L107 Disk Line Expanded

HOUSTON – The Librascope Division of The Singer Co. has three new additions to the L107 disk memory line.

Four storage capacities are offered, each in the same 9 in. by 9 in. by 6 in. size. Available capacities are: 3/4 Mbit at $3,150, 1 Mbit at $3,530, and 1-1/2 Mbit at $4,350. All prices in 1-9 quantities with 90 day delivery.

All memories of the L107 product line have identical electronic and mechanical interfaces, with electronics packaged on a single printed circuit board, including read, write, head select and clock electronics.

Interface signals are in NRZ format using standard TTL signal levels. High reliability has been designed into this memory product line as is evidenced by a calculated MTBF of 11,881 hours and completed testing of over 180,000 completed start-stops without degradation to the memory, according to Librascope.

The firm is at 1100 Francis Court, Glendale, Calif.

Cartridge Disk Drive Can Hold 11 Mbit

HOUSTON – Iomec's Iodisc 1001, a low-cost cartridge disk drive for minicomputers, has a capacity of 11 Mbit using the standard single-disk removable cartridge as the storage medium. Like other Iodisc Series 1000 drives, it has the "Accutrack" voice coil positioning system and one read/write head for each surface of the disk.

Prices start at less than $5,000 for a single unit, with OEM volume discounts going as low as $2,500 in 500 quantities.

The unit is also available as a complete data storage subsystem, with minicomputer interfaces, power, cabling, and packaging.

Delivery will be 60 days, from 345 Mathew St., Santa Clara, Calif.

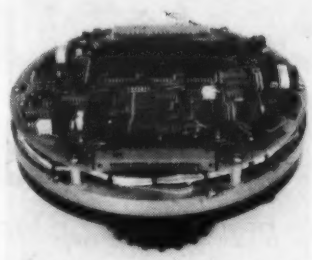
Programmable Controller Has Wide Range of Uses

HOUSTON – Ferroxcube's new FDC-300 is a programmable controller, designed for process, system or event monitoring; industrial control; data logging; data communications; and instrumentation applications.

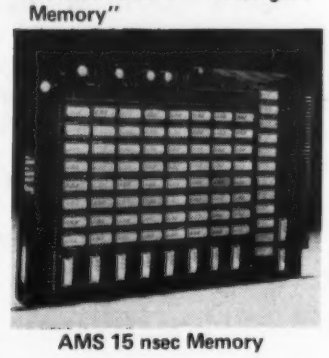
The unit is basically a 4K by 18-memory with minimum logic, and a few simple instructions.

Datapac SemPac RAM Memory

Ferroxcube's "Intelligent Memory"



Lockheed L107 Disk System



AMS 15 nsec Memory

The basic 4K memory can be utilized both as ROM and RAM and dedicated to a specific application such as the control of analytical instruments, the company said.

Model 302 utilizes the standard Ferroxcube FI-3 memory system with 2.5 μsec cycle time, while the Model 312 is the newest member of the FDC-300 series. It features the standard Ferroxcube FI-4, 1 μsec memory system.

Prices of the basic 4K by 18 FDC-302 start at $3,220 and are discounted to $2,450 in OEM quantities. The basic 4K by 18 Model FDC-312 starts at $3,620 and drops to $2,790 in OEM quantities.

Delivery for the FDC-302 is 60- to 90-days. Model FDC-312 delivery time will be the same, starting January, from Saugerties, N.Y.

Single PC Board Has Logic, Memory Functions

HOUSTON – Cogar Corp. announced a family of DTL/TTL compatible MOS read/write monolithic memories that are complete subsystems combining logic and memory functions on a single printed circuit card.

Each module contains up to 2K bits of memory. Signal buffers, word drivers, sense amplifers and latches are also included and one clock generates the required logic timing sequence.

The system is based on MOS technology for the storage arrays and bipolar technology for the interface electronics.

A read/write memory capacity up to 16K words by 9 bits is obtainable on a single plug-in card less than 8 in. by 9 in. card level. Access time is 250 nsec and cycle time is as low as 300 nsec.

Subsystems (single cards) may be stacked to produce larger capacity memories up to one million bytes.

Cogar is in Wappingers Falls, N.Y.

ICL Imports Two More

HOUSTON – International Computers (USA) Ltd., has a new magnetic tape drive and CRT keyboard display.

The Model 9 magnetic tape unit features automatic loading with or without cassette operating in the speed range of 112-1/2 in./sec to 200 in./sec.

Of single capstan design, it has a speed range from 37-1/2 in./sec to 200 in./sec.

The Model 7181 CRT keyboard display unit can display up to 2,000 characters on the screen, has a full editing capability and can stand alone. It has upper and lower case 96 character set. The 15 in. unit is small with only 90 W power consumption. OEM discounts available from its New York City headquarters.

Bridges' 3 Card Readers Get Double Fast Brothers

HOUSTON – Bridge Data Products' three new card readers include the Model 8800, which reads 80- and 96-column cards; Model 8060, which reads 80-column cards, and Model 8600, which reads 96-column cards. All three operate at speeds which approximately double the rates of the company's other card reader models.

The Model 8800 multiple card reader handles 80-column cards at 650 card/min or 96-column cards at 1,000 card/min.

The Model 8060 reads 80-column cards at 650 card/min. Model 8600 reads 96-column cards at 1,000 card/min.

In OEM quantities, the Model 8800 costs $2,500. The Model 8060 is priced at $2,000, and the Model 8600 at $2,250.

The firm is at 738 S. 42nd St., Philadelphia.

Punch Runs at 75 Char/Sec

HOUSTON – Remex, a unit of Ex-Cell-O Corp., introduced the latest model in its new line of paper tape punches.

The Model RPS-1075 paper tape punch operates continuously at 75 char/sec and can back space for error correction.

The unit has TTL compatible electronics and is available for rack mouting.

The unit is said to be competitively priced with quantity OEM discounts. Deliveries are scheduled to start in early 1971 from 5250 W. El Segundo Blvd., Hawthorne, Calif.

Nickels and Dimes

Sales are up, but with an operating loss, this time at **Infotronics** in Boulder, Colo. The company dropped $98,800 on net revenue of $3.4 million for the six months, while for the first half of last year it made $46,964 on a volume of $3.2 million. Infotronics head Dr. Hal Jones laid the blame to reduced second quarter shipments, increased manufacturing costs in the U.S., and the economy. More manufacturing is being diverted to the firm's Irish facility.

$$$

Redcor Corp. turned up a winning quarter, reporting net income of $53,000 on sales of $2.5 million for the first period. The earnings include the effect of a tax loss carryforward. Same time last year the firm lost $122,000 on sales of $1.3 million. Redcor recently acquired the makers of the KeyLogic data entry system.

$$$

Inforex says it has shipped 82 of its key entry systems, and has a firm backlog of 143 systems. Majority are on rental contract, deferring profits. President T.B. Horgan says that the shipment rate has doubled since mid-year.

Inforex has also formed an equipment rental partnership with U.S. Leasing and the St. Paul Co., which is obligated to "purchase up to a maximum of $7 million" of key entry systems in its first contract year. In addition, Inforex has sold the English marketing rights to the system in return for an agreement to purchase $6 million of the units in the next three years to a British firm.

$$$

Third quarter at **Itel** shows healthy gains in revenues, slimmer growth in profits. For the quarter sales rose to $17.4 million from $11.1 million, while net income reached $1.2 million, up from $877,000. On a per share basis, however, primary earnings grew from 23 cents to 27 cents.

For the nine months sales blossomed from $28.5 million to $46.9 million , net income grew from $2.4 million to $2.8 million, and EPS inched up from 62 cents to 66 cents.

$$$

Computer Dynamics, Oakland, Calif., software house, is "continuing to reflect the national economic slowdown"; i.e., it lost money in the third quarter.

Before taxes the company dropped $82,146 on revenues of $229,282. Same period in 1969: $31,328 before-tax loss on revenues of $314,400. Computer Dynamics is the purchaser of one of Informatics' former West Coast DP centers.

Leasco Abandons Plan to Acquire Pergamon

LONDON – Leasco Data Processing Equipment Corp. has given up trying to acquire Pergamon Press Ltd.

Originally touted as a means for the leasing company to build a wide-ranging information data bank service, the acquisition has been on the rocks since Aug. 26, when an audit revealed questions about Pergamon's bookkeeping.

Pergamon is a major publisher of scientific books.

In a joint statement Leasco and Pergamon said an exploration of Pergamon's "uncertain financial position" by Price, Waterhouse & Co., accountants, revealed "major uncertainties [which] remain unresolved."

'Profits Were Predicted'

The audit showed that Pergamon had lost $144,000 in 1968 and almost $4.9 million in the first nine months of 1969. Pergamon's management had forecast healthy profits for both periods.

Leasco, which owns 38% of Pergamon's outstanding common, had agreed with major institutional shareholders a year ago to bid for the remaining shares.

It has now declared that the "inadequate information" available on Pergamon's financial condition would prevent it from making a meaningful offer. "Accordingly, both parties accept that Leasco will not proceed with a bid," the statement said.

Substantial Writedown

The chairman of Leasco's executive committee, Bernard L. Schwartz, said in New York that Leasco will probably make a "substantial" writedown of its $23 million investment in about 5.3 million Pergamon shares. "We intend to write it down to a realizable value," he said, " and we will try to determine what that is as quickly as possible."

Leasco "will continue as a Pergamon shareholder," though, he noted.

The former chairman of Pergamon, Robert Maxwell, who controls 28% of Pergamon's stock, said at the September annual meeting that he was prepared to make an offer for the remaining stock if the Leasco bid fell through.

The statement reiterated an earlier Leasco undertaking "not to purchase any more shares in Pergamon, and, as a major shareholder, . . . [to] do what it reasonably can to ensure the future well-being and prosperity of the company in the interests of all shareholders."

The announcement also revealed that Leasco will make available 200,000 Pergamon shares for an executive incentive plan.

Leasco's two representatives on Pergamon's board of directors, Schwartz and Peter Stevens, have resigned from the board. A third, managing director Felix Kalinski, offered to resign but will stay on at the request of Pergamon management.

COMPUTERWORLD

financial

Extraordinary Items Turn Levin-Townsend Six-Month Profit Into Loss of $770,750

NEW YORK – Extraordinary items, primarily losses from the sale of subsidiaries and other interests, turned a six-months' profit for Levin-Townsend Computer Corp. into a loss of $770,750, or 23 cents a share.

In 1969's six months the troubled company made $2.6 million, before extraordinary items, working out to 79 cents a share.

For the 1970 period, the profit before extraordinary items was $1.1 million, or 33 cents per share.

For the six months ended Sept. 30, 1970, the company incurred a net extraordinary loss of $1.9 million. For the same period of the prior fiscal year, there was a net extraordinary gain of $978,921 included in total net income of $3.6 million, or $1.09 per share.

The extraordinary items for this fiscal period included losses from operations which have been, or are in the process of being discontinued or sold, including computer programming and consulting services to the securities industries; a loss on the sale of National Equities of Florida, Inc., net of minority interest and taxes and credit from tax benefits derived from subsidiary company extraordinary losses.

In reporting results, James E. Townsend, president of Levin-Townsend disclosed that National Equities, Inc., an 82%-owned subsidiary has sold all of its subsidiary's holdings in Las Vegas, Nev. [CW, Nickels and Dimes, Nov. 11]. The operating loss of these properties from April 1, 1970, to the date of sale amounted to $977,181. This loss has been charged against Levin-Townsend's fiscal six-month operations as an extraordinary item. No further extraordinary charges are anticipated from these properties.

The company's chief executive further noted that the principal remaining activities of Levin-Townsend are: computer leasing, the financial services activity of Levin-Townsend Service Corp., and the operations of its real estate subsidiary, National Equities, Inc., which are all operating on a profitable basis and should continue to do so throughout the balance of the fiscal year.

Levin-Townsend's computer equipment portfolio, at original purchase cost, is in excess of $158 million. The major remaining properties of National Equities, Inc. consist of two air-conditioned mall shopping centers in Toronto, Canada, and approximately 3,800 acres of land under development within the city limits of New Orleans.

"We have brought the company back to the profit side of the ledger and all our efforts and the company's resources are being directed to continuing profits on existing operations," Townsend stated.

Lloyds Bank Links 2,350 Branches

LONDON – While intensive use of computers in financial institutions is now common in the U.S., Europe is still lagging a bit behind, but gaining fast.

Lloyds Bank, one of the smaller major English banks, has recently completed the automation of its 1,550 branches and 800 sub-branches, finishing a four-year plan.

Lloyds is the first British bank to accomplish this.

The new accounting system handles some five million accounts, including nearly three million current accounts, which generate entries at the rate of 380 million a year.

800 Branches On-Line

The system is based on two main centers, one in London and one in Birmingham , each equipped with twin 360/65s. Accounts for some 800 branches are handled on-line by the IBM 3980 Bank Teleprocessing System devised and manufactured by IBM United Kingdom, Ltd.

The remaining branches record their transactions on paper tape which is either transmitted to the computing centers, or, in the case of branches near the centers, delivered by van.

According to Lloyds, the computer system has led to a dramatic reduction in pressure on the staff since all the branch accounting is carried out at the computer center and the staff is freed for customer service.

One of the problems in designning the system was the conversion of the English monetary system to decimal base, which will take place Feb. 15, 1971.

After Decimalisation Day all the branches will go on-line.

The bank's capital investment program in computer equipment installed or on order is currently running at nearly $60 million. The biggest slice of the investment is related to the branch accounting program, which is only part of a major plan to apply EDP to the full range of banking and specialist services.

Close Cooperation

The automation required close cooperation not only with IBM but with the Post Office, which in England controls telecommunication, to ensure the provision of telephone line facilities.

Tally Compiles 3d Quarter Profit

KENT, Wash. – Tally Corp., maker of peripherals and data communication gear, had much improved profits and sales for both the third quarter and the nine months ending Oct. 4.

Tally's net income for the nine months was $264,000, equivalent to 15 cents per share, as compared with a loss of $1.7 million for the 1969 period.

Sales of $10.9 million were just 1% below total sales for all last year and represent a 50% increase over the $7.3 million reported in the first nine months of 1969.

The company's third quarter earnings were $77,000, or 4 cents a share, comparable to the two earlier quarters despite the reduction in new business adversely affecting a large segment of the computer industry.

Third quarter sales were $3.4 million up from $2.7 million in the 1969 period.

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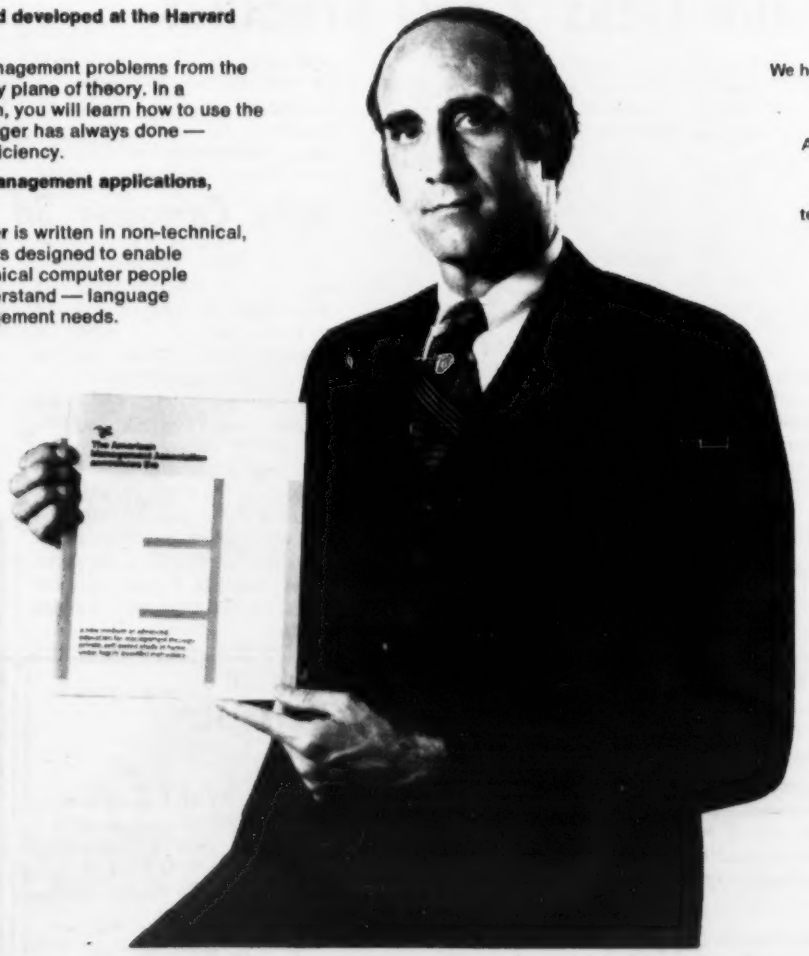

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Computerworld Stock Trading Summary

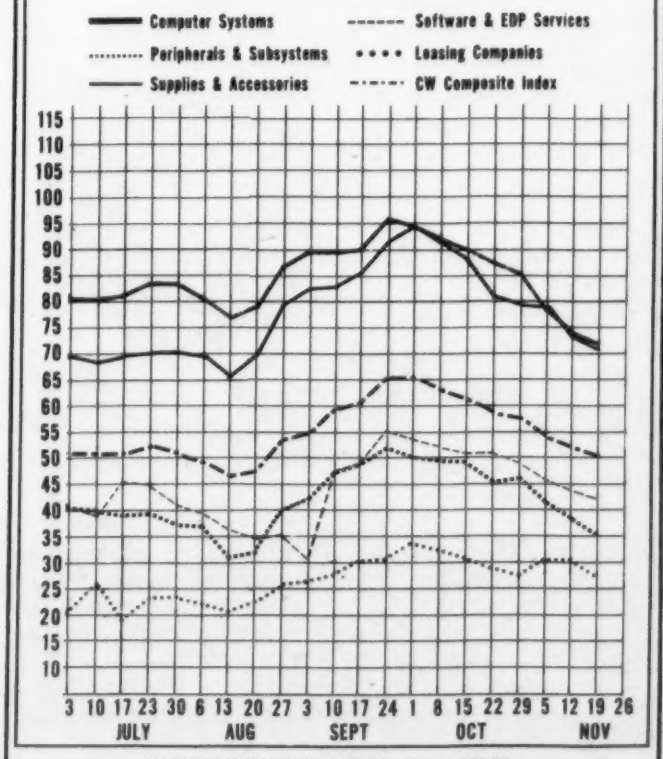
All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, NOVEMBER 19, 1970

EXCH		1970 RANGE (1)	CLOSE NOV 19 1970	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	1 7/8	- 1/4	-11.7
A	APPLIED DATA RES.	4- 24	5 1/2	- 5/8	-10.2
O	APPLIED LOGIC	1- 19	1 1/8	- 1/4	-18.1
O	ARIES	1- 8	2	- 3/8	-15.7
A	AUTOMATIC DATA PROC	23- 47	40 7/8	-1 1/2	-3.5
O	AUTO SCIENCES	3- 14	5 1/4	- 5/8	-10.6
O	BRANDON APPLIED SYS	1- 9	1 1/8	- 1/4	-18.1
O	COMPUTER AGE INDUS.	1- 3	1	0	0.0
O	COMPUTER ENVIRON	2- 14	1 1/2	-1	-40.0
O	COMPUTER INDUS.	2- 10	3 1/2	-1 1/2	-30.0
O	COMPUTER NETWORK	3- 14	3	0	0.0
O	COMPUTER PROPERTY	5- 15	5 1/4	- 1/4	-4.5
N	COMPUTER SCIENCES	6- 34	9 3/8	-1 1/8	-10.7
O	COMPUTER USAGE	2- 8	4	0	0.0
A	COMPUTING & SOFTWARE	16- 75	29 1/8	+1 3/8	+4.9
O	COMRESS	1- 10	1 1/2	- 3/8	-20.0
O	COMSHARE	3- 15	3 5/8	- 1/4	-6.4
O	CONSOL. ANAL. CENT.	1- 3	1	- 1/4	-20.0
O	DATA AUTOMATION	1- 24	1 1/2	- 3/8	-20.0
O	DATA PACKAGING	5- 29	5 5/8	- 3/8	-6.2
O	DATAMATION SERVICE	1- 6	1 3/8	- 3/4	-35.2
O	DATATAB	4- 9	3 3/4	- 1/4	-6.2
O	DIGITEK	1- 5	1 1/4	- 1/8	-9.0
O	EDP RESOURCES	5- 13	6 1/2	- 1/4	-3.7
A	ELECT COMP PROG	3- 11	3 5/8	- 3/8	-9.3
O	ELECTRONIC DATA SYS.	31-161	53	-7 1/2	-12.3
O	INFORMATICS	4- 21	6	- 1/8	-2.0
A	ITEL	6- 26	15 7/8	- 3/4	-4.5
O	LEVIN-TOWNSEND SERV.	1- 13	2 1/4	0	0.0
A	MANAGEMENT DATA	8- 25	8 1/4	- 7/8	-9.5
O	NAT COMP ANALYSTS	1- 8	2 1/4	0	0.0
O	NAT.COMP. SERV.	2- 12	2 1/2	- 3/4	-23.0
N	PLANNING RESEARCH	13- 54	17	- 5/8	-3.5
O	PROGRAMMING METHODS	9- 27	15	-1	-6.2
O	PROGRAMMING & SYS	2- 5	2	0	0.0
L	PROGRAMMING SCIENCES	1- 33	1 1/8	- 1/2	-30.7
N	SCIENTIFIC RESOURCES	2- 22	3 1/8	- 5/8	-16.6
O	SOFTWARE SYSTEMS	1- 2	3/8	- 1/4	-40.0
O	TBS COMPUTER CENTERS	4- 27	4 1/2	0	0.0
O	UNITED DATA CENTER	2- 4	1 1/2	- 3/4	-33.3
N	UNIVERSITY COMPUTING	14- 99	19 1/2	-1 1/2	-7.1
A	URS SYSTEMS	5- 21	7 3/8	+ 1/4	+3.5
O	U.S. TIME SHARING	3- 14	2 1/2	- 1/4	-9.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	21- 62	22 3/8	-1 1/4	-5.2
O	ALPHANUMERIC	2- 15	3 3/8	- 5/8	-15.6
N	AMPEX CORP	13- 48	14 5/8	-1 5/8	-10.0
O	ASTRODATA	1- 34	1 3/8	- 3/4	-35.2
O	ATLANTIC TECHNOLOGY	2- 14	5 1/4	- 1/4	-4.5
A	BOLT,BERANEK & NEW	3- 11	6 1/2	- 3/8	-5.4
N	BUNKER-RAMO	6- 14	8 1/2	- 3/8	-4.2
A	CALCOMP	11- 34	28 1/4	-1 7/8	-6.2
O	COGNITRONICS	3- 13	4 7/8•	- 7/8	-15.2
O	COLORADO INSTRUMENTS	4- 13	5 3/4	- 7/8	-13.2
O	COMPUTER COMMUN.	5- 36	5	-1 1/2	-23.0
A	COMPUTER EQUIPMENT	4- 12	3 7/8	- 1/8	-3.1
A	COMPUTEST	12- 28	12 3/8	+ 3/8	+3.1
O	CONSOL COMPUTER SVCS	4- 14	6 3/4	+1	+17.3
A	DATA PRODUCTS CORP	5- 26	6 1/4	- 1/8	-1.9
O	DATA TECHNOLOGY	4- 23	3 5/8	- 1/4	-6.4
O	DIGITRONICS	4- 13	3 5/8	- 1/2	-12.1
N	ELECTRONIC M & M	7- 40	7 5/8	-1 3/8	-15.2
O	FABRI-TEK	2- 8	2 1/8	- 1/8	-5.5
O	FARRINGTON MFG	2- 17	2 3/8	- 1/4	-9.5
O	INFORMATION DISPLAYS	4- 20	6	- 1/2	-7.6
O	MANAGEMENT ASSIST	1- 4	1	- 1/8	-11.1
A	MARSHALL INDUSTRIES	14- 67	22 3/8	- 3/4	-3.2
A	MILGO ELECTRONICS	15- 42	28 7/8	- 1/8	-0.4
N	MOHAWK DATA SCI	19- 87	24 1/4	-1 1/4	-4.9
O	OPTICAL SCANNING	11- 52	15	-3	-16.6
O	PHOTON	4- 17	7 5/8	-1 5/8	-17.5
O	PHOTO-MAGNETIC SYS.	1- 9	1 3/8	0	0.0
A	POTTER INSTRUMENT	15- 42	17 5/8	-1 1/8	-6.0
O	PRECISION INST.	6- 25	8	-1	-11.1
O	RECOGNITION EQUIP	12- 83	12 3/8	-2 3/8	-16.1
O	REDCOR CORP.	4- 34	4 1/4	-1 1/4	-22.7
N	SANDERS ASSOCIATES	7- 29	10	-1 1/4	-11.1
O	SCAN DATA	5- 53	5 1/8	- 3/8	-6.8
O	TALLY CORP.	10- 23	12	-1	-7.6
N	TELEX	10- 25	19 5/8	+ 1/4	+1.2
O	VIATRON	2- 51	3	- 3/8	-11.1
	SUPPLIES & ACCESSORIES				
N	ADAMS-MILLIS CORP	8- 15	12 1/4	- 1/2	-3.9
O	BALTIMORE BUS FORMS	7- 21	8 1/2	- 1/2	-7.1
A	BARRY WRIGHT	6- 25	7 5/8	- 1/4	-3.1
A	DATA DOCUMENTS	15- 35	18	+ 3/4	+4.3
N	ENNIS BUS. FORMS	10- 19	9 7/8	- 1/8	-1.2
O	GRAHAM MAGNETICS	5- 10	7 3/4	-1 1/4	-13.8
O	GRAPHIC CONTROLS	7- 17	6 3/4	-1	-12.9
N	MEMOREX	46-166	72 3/4	-2	-2.6
N	3M COMPANY	71-114	85 1/2	- 1/2	-0.5
O	MOORE BUS. FORMS	27- 38	32	0	0.0
N	NASHUA CORP	21- 43	25	-1 1/2	-5.6
O	REYNOLDS & REYNOLD	25- 48	38 1/4	+ 3/4	+2.0
O	STANDARD REGISTER	17- 30	18 1/4	-1	-5.1
N	UARCO	22- 39	23 1/2	+ 3/4	+3.2
A	WABASH MAGNETICS	7- 30	7	- 3/4	-9.6
O	WALLACE BUS FORMS	17- 41	16 1/2	-1 1/8	-6.3
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	78-173	101	-4 3/4	-4.4
N	COLLINS RADIO	9- 37	11 5/8	-1 1/4	-9.7
N	CONTROL DATA CORP	30-122	44	+ 1/2	+1.1
O	DATA GENERAL CORP	16- 59	23	-3 3/4	-14.0
A	DIGITAL EQUIPMENT	50-124	54 5/8	-1 3/8	-2.4
N	ELECTRONIC ASSOC.	3- 11	4 1/8	- 3/8	-8.3
A	ELECTRONIC ENGINEER.	3- 14	4 1/8	- 1/4	-5.7
N	FOXBORO	18- 39	19	-2 3/8	-11.1
O	GENERAL AUTOMATION	9- 42	12	0	0.0
N	GENERAL ELECTRIC	60- 88	85 3/4	+ 1/8	+0.1
N	HEWLETT-PACKARD CO	19- 45	25 3/8	+ 3/8	+1.5
N	HONEYWELL INC	65-152	72	-2	-2.7
N	IBM	223-387	291	-6 1/8	-2.0
N	NCR	30- 86	31 3/4	-2 3/4	-7.9
N	RCA	18- 34	22	-1 3/8	-5.8
N	RAYTHEON CO	16- 33	20 1/8	- 1/8	-0.6
O	SCI. CONTROL CORP.	1- 8	1 1/2	- 3/8	-20.0
N	SPERRY RAND	19- 40	21 7/8	- 5/8	-2.7
A	SYSTEMS ENG. LABS	10- 49	14	-1 5/8	-10.3
N	VARIAN ASSOCIATES	9- 29	11 3/8	- 3/8	-3.1
A	WANG LABS.	18- 51	28 5/8	-1 1/2	-4.9
N	XEROX CORP	66-115	83 1/2	+ 1/2	+0.6
	LEASING COMPANIES				
O	BOOTHE COMPUTER	8- 25	11 3/4	- 7/8	-6.9
O	BRESNAHAN COMP.	2- 9	2	- 5/8	-23.8
O	COMPUTER EXCHANGE	2- 8	4 3/8	- 5/8	-12.5
A	COMPUTER INVSTRS GRP	4- 12	7	- 1/2	-6.6
N	DATA PROC. F & G	6- 32	9 7/8	-1 1/4	-11.2
O	DATRONIC RENTAL	2- 8	2 3/4	- 1/4	-8.3
A	DEARBORN COMPUTER	10- 24	19 3/8	-1 3/8	-6.6
O	DIEBOLD COMP. LEAS.	2- 8	3 3/4	- 3/8	-9.0
A	DPA, INC.	3- 10	3 7/8	- 3/8	-8.8
A	GRANITE MGT	7- 22	9 1/4	- 7/8	-8.6
A	GREYHOUND COMPUTER	5- 44	6 3/4	- 1/4	-3.5
N	LEASCO DATA PROC.	7- 30	10	- 7/8	-8.0
O	LECTRO COMP LEAS	2- 9	2 1/8	- 1/2	-19.0
A	LEVIN-TOWNSEND CMP	3- 19	5	- 5/8	-11.1
O	LMC DATA, INC.	1- 3	3/4	- 3/8	-33.3
O	NCC INDUSTRIES	3- 8	3 3/8	- 3/8	-10.0
O	SYSTEMS CAPITAL	1- 8	2 1/4	- 3/8	-14.2
N	U.S. LEASING	3- 19	12 1/2	- 1/2	-3.8

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

Earnings Reports

ELECTRONIC DATA SYSTEMS
Three Months Ended Sept. 30

	1970	1969
Shr Ernd	$.18	$.12
Revenue	16,300,378	7,192,658
Earnings	2,113,372	1,404,784

REDCOR CORP.
Three Months Ended Sept. 27

	1970	a1969
Revenue	$2,451,000	$1,303,000
Earnings (Loss)	b53,000	(122,000)

a-Restated to reflect acquisition on a pooling-of-interests basis. b-Includes credit on federal income tax loss carryforward.

LEVIN-TOWNSEND COMPUTER
Six Months Ended Sept. 30

	1971	a1969
bShr Ernd	$.33	$.79
Revenue	25,382,068	26,019,448
Spec Item	d1,877,917	c978,921
Earnings (Loss)	(770,750)	e3,584,690

a-Operations that have been or are to be sold or discontinued have been classified as extraordinary items in fiscal 1969 in conformity with fiscal 1970 presentation. b-Based on income before special items and on common and common equivalent shares. c-Credit; operating profit on properties held for sale. d-Debit; consists of operating loss on properties held for sale, loss on sale of Florida subsidiary, and tax benefits applicable to extraordinary losses of subsidiary companies. e-Equal to $1.09 a share.

On a fully diluted basis, share earnings would be equal to 33 cents in 1970 and 77 cents in 1969 before special items and $1.04 after special item in 1969.

CINCINNATI MILACRON INC.
Four Months Ended Oct. 10

	1970	1969
Shr Ernd	a$.33	$1.04
Revenue	70,800,000	81,402,596
Spec Cred	b8,000,000	.....
Earnings	c9,300,000	3,783,229
10 Mo Shr	a1.85	3.06
Revenue	208,400,000	217,698,541
Spec Cred	b8,000,000	.....
Earnings	c14,800,000	11,117,671

a-Based on income before special credit. b-Gain after tax, realized from sale of interest in joint venture in W. Germany. c-Equal to $2.56 a share in the four months and $4.08 a share in the 10 month periods.

COMPUTER INVESTORS GROUP
Six Months Ended Sept.30

	1970	a1969
Shr Ernd	b$.30	$.20
Revenue	4,848,703	3,783,350
Earnings	596,691	373,546
Spec Cred	c24,000	.....
Earnings	e620,691	373,546

a-Restated. b-Based on income before special credit. c-Consists of gain of $159,000 from purchase of portion of subordinated debentures and a loss of $135,000 from provision for estimated loss on its investment and advances to its semiconductor affiliate. e-Equal to 31 cents a share.

COMPUTER DIMENSIONS, INC.
Three Months Ended Sept. 30

	1970	1969
Shr Ernd	$.05	($.26)
Revenue	1,591,000	1,040,000
Earnings (Loss)	58,000	(260,000)
9 Mo Shr (Loss)	.13	(.60)
Revenue	4,089,000	3,004,000
Earnings (Loss)	165,000	(595,000)

All figures reflect a pooling of interest with Investment Control, Inc. and the acquisition of Financial Research Consultants and California Bankdata Corp. completed in the third quarter.

DATAMATION SERVICES, INC.
Three Months Ended Sept. 30

	1970	1969
Shr Ernd (Loss)	.02	(.08)
Revenue	739,258	840,271
Earnings (Loss)	20,084	(86,806)
9 Mo Shr (Loss)	($.04)	($.02)
Revenue	2,084,676	2,811,704
Loss	52,333	22,956

ADVANCED SYSTEMS, INC.
Three Months Ended Sept. 30

	1970	1969
Shr Ernd	$.21	$.07
Revenue	779,903	308,332
Earnings	126,255	41,929
6 Mo Shr (Loss)	.40	(.01)
Revenue	1,453,874	373,340
Earnings (Loss)	244,673	(6,992)

Buying computer tape is a lot like getting married.

No matter what brand of tape you buy, you're gonna have to live with it for a long time. For better or worse. Through read and write.

So it pays to look under the make-up and fancy promises—to find out what you're really getting before you say, "I do."

For instance, one leading tape manufacturer talks about a one year, 200-pass warranty. But the warranty for defective tapes terminates on completion of the first write pass . . . or the first read pass . . . or 90 days from delivery.

EPOCH 4

permanent magnetic tape

And another real sweetheart requires initial use within 90 days. And excludes tape testers.

Then there's Epoch 4—the one with the twenty-year warranty. No gimmicks, no tricky clauses. Epoch 4 will meet the original specs for twenty years. Or we'll replace it.

Sure, it pays to look over the field before you make a commitment—in marriage, or in computer tape. Just be sure you meet the beautiful performer with the twenty-year dowry—Epoch 4 from Graham Magnetics. You'll fall in love with it.

GRAHAM MAGNETICS INCORPORATED

Graham, Texas 76046 WATS Phone 800-433-2701 Texas Phone 817-549-3211